An Examination of Intolerance of Uncertainty as a Maintenance Factor for Eating Disorder Symptoms

Alice Jane Heikkonen

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A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy (Clinical Psychology) of the Australian National University

Declaration of Authorship

I declare that this thesis reports my original work, that no part has been previously accepted or presented for the award of any degree or diploma from any university, and that to the best of my knowledge, no material published or written by any other person is included, except where due acknowledgement is given.

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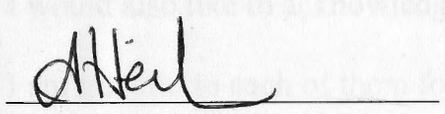

Alice Heikkonen

Date:

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Abstract

Eating disorders are characterised by a myriad of distressing psychological symptoms, serious medical risks, and the potential for a severe and chronic course of illness which is difficult to treat. Obtaining further insight into the constructs implicated in the maintenance of eating disorder symptoms is expected to be particularly valuable for informing treatment development. Based on this rationale, intolerance of uncertainty is proposed as a construct worthy of investigation in the eating disorders context. Intolerance of uncertainty refers to a tendency or predisposition to perceive uncertainty as negative or threatening and to react to uncertainty with typically negative emotional, cognitive, and behavioural responses (Boelen & Reijntjes, 2009; Buhr & Dugas, 2006; Grenier, Barrette, & Ladouceur, 2005). Although intolerance of uncertainty has received significant attention in the anxiety disorders field, its examination in the eating disorders context is limited. A small body of research provides preliminary support for an association between intolerance of uncertainty and eating disorders, however further investigation is needed to clarify its specific role in this context. The current program of research aimed to investigate the experience of uncertainty for individuals with eating disorders and to examine the role of intolerance of uncertainty as a possible maintenance factor for eating disorder symptoms. A series of three studies was conducted to address these aims, and included the use of qualitative, correlational, and experimental methodologies.

The first study utilised one-to-one, semi-structured interviews to investigate the lived experience of uncertainty for women with eating disorders. The study obtained in-depth accounts from five women undergoing treatment in an eating disorder inpatient unit. The research partially replicated and extended a previous qualitative study conducted by Sternheim, Konstantellou, Startup, and Schmidt (2011), and similarly

employed the use of interpretative phenomenological analysis to analyse the data. The findings of this first study highlighted the frequent and intense experience of uncertainty for women with eating disorders, which was identified as pervasive across both disorder-specific and non-specific contexts. Patients described numerous, typically maladaptive strategies employed to cope with uncertainty, which included engagement in a range of eating disorder behaviours, thus lending preliminary support to a potential role of intolerance of uncertainty for symptom maintenance. In addition, patients described their experience of uncertainty as more intense following onset of the eating disorder, and also reported an exacerbation in eating disorder symptoms due to their experience of uncertainty.

The second study examined the interrelationships between intolerance of uncertainty and eating disorder symptoms in a community-based sample of adult women. An additional distinction was made between general intolerance of uncertainty and intolerance of uncertainty specific to eating and weight, in order to investigate the content specificity of the construct. Adding to previous research linking intolerance of uncertainty and problematic eating attitudes (Konstantellou & Reynolds, 2010), the study found intolerance of uncertainty specific to eating and weight in particular - to show an association with a range of eating disorder attitudes and behaviours, including dietary restraint. Intolerance of uncertainty in the domain of eating and weight accounted for a proportion of variance in dietary restraint beyond the inclusion of a number of previously established correlates of eating disorder symptoms. Preliminary support was found for a proposed model specifying intolerance of uncertainty specific to eating and weight as a mediator of the relationship between shape and weight concerns and dietary restraint. The study was correlational however, and experimental research is needed to infer causality in these relationships.

As such, the third and final study comprised the first known research to specifically test the causal effects of intolerance of uncertainty on eating disorder symptoms using an experimental methodology. The study consisted of a university-based sample of adult women, and sought to temporarily induce a high or low general intolerance of uncertainty. The experimental paradigm was informed by previous research by Rosen, Knäuper, and Sammut (2007), as well as dissonance theory and dissonance-based interventions (Festinger, 1957; Stice, Mazotti, Weibel, & Agras, 2000). A high intolerance of uncertainty was found to predict heightened negative affect in response to an instance of eating-related uncertainty, however intolerance of uncertainty did not predict eating- or weight-related variables. On the basis of these results, a general intolerance of uncertainty was proposed as a distal factor in the eating disorders context, prompting increased negative affect in response to uncertainty. If sufficiently intense, this negative affect may prompt eating disorder symptoms over time, however this successive pathway requires further investigation.

The findings of the current research project suggest a number of important theoretical and clinical implications. Specifically, the research highlights the potential utility of including intolerance of uncertainty as a factor for consideration in current eating disorder maintenance models, and in the assessment and formulation of eating disorder symptoms. Due to the preliminary nature of the current research, the importance of replication is emphasised and a number of specific directions for future research are presented. In particular, an experimental examination of intolerance of uncertainty specific to eating, shape, and weight is likely to be especially valuable for clarifying its causal role in the eating disorders context. The current research has sought to encourage continued attention to this construct in the eating disorders field, and provide guidance for future research to continue examination of intolerance of uncertainty as a maintenance factor for eating disorder symptoms.

Chapter 1: Introduction

Eating disorders are a significant concern for the community and especially for the affected individuals, families, and treating practitioners who deal with these conditions on a daily basis. The myriad psychological processes implicated in eating disorder development and maintenance are not yet well understood, and continued research in the area is vital for advancing prevention and treatment. Insight into factors implicated in the maintenance of eating disorder symptoms is particularly valuable for guiding treatment development. Thus the aim of the current research project is to investigate a possible maintenance factor that is yet to be adequately investigated in the context of eating disorder symptoms, namely, intolerance of uncertainty. Although several definitions have been put forward, intolerance of uncertainty has been defined as a tendency or predisposition to perceive uncertainty as negative or threatening and to react to uncertainty with various (typically negative) emotional, cognitive, and behavioural responses (Boelen & Reijntjes, 2009; Buhr & Dugas, 2006; Grenier et al., 2005). The majority of research examining intolerance of uncertainty has occurred within the anxiety disorders field, however a possible role of intolerance of uncertainty in eating disorders has recently been acknowledged.

A general dislike of uncertainty is normative, however a high intolerance of uncertainty appears to be maladaptive. Given that uncertainty features in numerous aspects of everyday life, many circumstances may induce distress (such as low mood and heightened anxiety) for individuals with a high intolerance of uncertainty (Buhr & Dugas, 2002; Dugas, Gosselin, & Ladouceur, 2001; Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994). Furthermore, individuals may seek to avoid the distress experienced in relation to uncertainty by actively avoiding situations that involve uncertainty, which may impair functioning (Dugas, Freeston, & Ladoucer, 1997). Given the potential distress and impairment associated with an intolerance of

uncertainty, further investigation into a possible role of intolerance of uncertainty in the eating disorders context appears warranted. The current research therefore aims to obtain an in-depth understanding of the experience of uncertainty for eating disorder patients and investigate a hypothesised role of intolerance of uncertainty in the maintenance of eating disorder symptoms.

1.1 Overview of Eating Disorders

The domain of eating disorders is comprised of several diagnoses and subtypes, which include unique and overlapping elements. The *Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition* (*DSM-IV-TR*; American Psychiatric Association [APA], 2000) delineates two specific diagnoses, namely, Anorexia Nervosa and Bulimia Nervosa. It also includes a third diagnosis of Eating Disorder Not Otherwise Specified (EDNOS) for individuals who do not meet the full criteria for a specific eating disorder. In regards to gender, women are strongly overrepresented in eating disorders, compared to men who constitute approximately 10 per cent of the eating disorder population (Andersen, 1999; APA, 2000; Hudson, Hiripi, Pope, & Kessler, 2007). Eating disorders are associated with an elevated risk of numerous psychological and medical problems, and the highest risks pertain to the most severe eating disorder diagnosis - anorexia nervosa.

Anorexia nervosa is characterised by (a) a refusal to maintain a minimally normal body weight (approximated at 85% of the normal weight for age and height), (b) an intense fear of weight gain (despite being underweight), and (c) shape or weight overvaluation, a disturbance in the perception of one's weight or shape, or denial of the seriousness of being significantly underweight (APA, 2000). Amenorrhoea is also a required criterion in postmenarcheal females, however the utility of this criterion has been questioned (Garfinkel et al., 1996). Indeed, in the pending fifth edition of the DSM (*DSM-5*; APA, 2010), this criterion is expected to be removed. Anorexia nervosa

may be further classified by subtype, denoted as Binge Eating/Purging Type if the person engages in binge-eating and/or purging behaviour, or Restricting Type if the person does not regularly engage in these behaviours and, rather, engages solely in dieting, fasting, or excessive exercise (APA, 2000). The lifetime prevalence of anorexia nervosa is approximated at 0.5-1.0% of women (APA, 2000; Garfinkel et al., 1996; Hudson et al., 2007), and the average age of onset for anorexia nervosa is mid- to late adolescence (Lewinsohn, Striegel-Moore, & Seeley, 2000).

In comparison, bulimia nervosa is characterised by recurrent episodes of binge eating and inappropriate compensatory behaviour (undertaken to prevent weight gain) (APA, 2000). Both the binge eating and compensatory behaviours are required to occur at least twice per week for three months (which is expected to be reduced to once per week in the *DSM-5* [APA, 2010]). Overvaluation of shape and weight is also a required criterion for diagnosis. In order to meet criteria for diagnosis, binges must be "objective", defined as the consumption of "an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances" (APA, 2000, p. 594). In addition, the individual must experience a sense of lack of control over eating during the binge episode. Bulimia nervosa may also be further classified by subtype, denoted as Purging Type if the person regularly engages in self-induced vomiting or laxative/diuretic misuse, or Nonpurging Type if other inappropriate compensatory behaviours are employed (e.g., fasting or excessive exercise) (APA, 2000). The lifetime prevalence of bulimia nervosa in women is estimated to be 1.0-3.0% (Hudson et al., 2007). The average age of onset for bulimia nervosa is slightly later than anorexia nervosa, and typically presents in late adolescence or early adulthood (APA, 2000; Lewinsohn et al., 2000).

As indicated above, EDNOS is a residual category for eating disorders that do not meet criteria for a more specific diagnosis. Eating disorders frequently present at

sub-threshold levels, and indeed EDNOS is the most common eating disorder diagnosis (APA, 2000; Fairburn, Cooper, Shafran, & Wilson, 2008). The prevalence rate of partial eating disorders is argued to be at least twice that of full-syndrome eating disorders (Polivy & Herman, 2002), and indeed a ratio of 3:1 for partial- to full-syndrome anorexia nervosa has been reported (Garfinkel et al., 1996). In addition to these sub-threshold cases, the EDNOS category includes sub-threshold cases of anorexia nervosa (such as women who meet all criteria except amenorrhoea) and sub-threshold cases of bulimia nervosa (such as individuals who engage in binge eating or compensatory behaviour at a frequency below the specified criterion) (APA, 2000; Fairburn et al., 2008). A number of these cases are expected to meet full criteria for anorexia nervosa or bulimia nervosa based on the revisions planned for the upcoming *DSM-5* (APA, 2010). The current EDNOS category also includes binge-eating disorder, which refers to recurrent binge eating episodes without the use of inappropriate compensatory behaviours (APA, 2000). In the pending *DSM-5*, binge eating disorder has also been planned for inclusion as a separate diagnosis due to its distinctive diagnostic presentation and course (APA, 2010; Fairburn & Cooper, 2011). Onset for binge eating disorder typically occurs in late adolescence or the early 20s, but can also present in middle-age (Fairburn et al., 2008; Johnson, Spitzer, & Williams, 2001). The gender difference appears less pronounced in the prevalence of binge eating disorder, compared with other eating disorder diagnoses (Striegel-Moore & Franko, 2003). A lifetime prevalence estimate for binge eating disorder has been reported as 3.5% of women and 2% of men (Hudson et al., 2007).

Although the distinct diagnostic categories are widely accepted, a transdiagnostic conceptualisation of eating disorders has been proposed on the basis of the substantial overlap amongst eating disorders and potentially shared underlying core psychopathology (Fairburn, Cooper, & Shafran, 2003; Fairburn et al., 2008). Indeed,

Fairburn and colleagues (2003) propose that an over-evaluation of eating, shape, and weight and their control is the core psychopathology underlying all eating disorders. This over-evaluation entails the judgement of self-worth predominantly on the basis of shape and weight and one's ability to control his/her eating, shape, and weight (Fairburn et al., 2008). Indeed, as a related feature, both anorexia nervosa and bulimia nervosa share the diagnostic criterion of an overconcern with body shape and weight (APA, 2000). However, while there are substantial similarities amongst the disorders, there are also several noteworthy differences. The primary differentiating characteristic of the disorders relates to the individual's current body weight. In order to receive a diagnosis of anorexia nervosa, an individual must maintain an unduly low body weight. A secondary, non-diagnostic difference in the conditions relates to insight and motivation. Insight into the seriousness of the condition is typically poorer in individuals with anorexia nervosa, who may exhibit low motivation for change (APA; 2000; Blake, Turnbull, & Treasure, 1997; Casasnovas et al., 2007; Rieger, Touyz, & Beumont, 2002; Vitousek, Watson, & Wilson, 1998). Individuals with bulimia nervosa, conversely, are typically more motivated for treatment, due to the distressing nature of binges and the perceived loss of control (APA, 2000; Fairburn et al., 2008; Vitousek et al., 1998). Aside from these differences however, the majority of possible diagnostic symptoms for anorexia nervosa and bulimia nervosa are shared.

The shared features of eating disorders correspond to numerous shared risks for psychological and medical problems occurring as a result of the disorder. Across the diagnoses, individuals with eating disorders are at an elevated risk of disability, health problems, and psychosocial stress (Bulik & Reichborn-Kjennerud, 2003; Johnson et al., 2001). In regards to psychological disturbance, eating disorders have been associated with an elevated risk for anxiety disorders, depressive disorders, insomnia, and suicide ideation and attempts (Johnson, Cohen, Kasen, & Brook, 2002; Johnson et al., 2001).

In addition to depression and anxiety, substance dependence and personality disorders are also common comorbid diagnoses (Braun, Sunday, & Halmi, 1994; Carlat, Camargo, & Herzog, 1997; Johnson et al., 2001; Lewinsohn et al., 2000). Medical correlates of eating disorders include a heightened risk of cardiovascular symptoms, chronic fatigue, chronic pain, infectious diseases, and neurological symptoms (Johnson et al., 2002). A number of medical problems can also occur as a result of starvation and electrolyte imbalances (due to self-induced vomiting and laxative misuse) (Brown & Mehler, 2013; Sharp & Freeman, 1993). Self-induced vomiting, which can occur in both anorexia nervosa and bulimia nervosa, may result in cardiovascular, oral, dental, oesophageal, gastrointestinal, and renal complications (Brown & Mehler, 2013; Sharp & Freeman, 1993).

In addition to the heightened risk for medical complications shared across disorders, anorexia nervosa entails a number of additional risks. Anorexia nervosa has a substantially high risk of mortality, exceeding that of most other psychiatric disorders (Harris & Barraclough, 1998; Sullivan, 1995). Standardised mortality ratios reported in the literature have varied widely, however the assessment of a large cohort of 6009 women with anorexia nervosa indicated an overall standardised mortality rate of 6.2 (Papadopoulos, Ekbom, Brandt, & Ekselius, 2009). These statistics suggests a mortality rate for individuals with anorexia nervosa as more than six times higher than that for the general population. In another large study, a standardised mortality ratio of 10.5 was reported (Birmingham, Su, Hlynsky, Goldner, & Gao, 2005). In regard to the crude mortality rate, a meta-analytic study by Sullivan (1995) reported a rate of 5.90% in anorexia nervosa over 10 years, indicated to be more than 12 times higher than all causes of death for females aged 15-24 years old and more than twice the rate for female psychiatric inpatients aged 10-39 years old. The most common causes of death for individuals with anorexia nervosa relate to suicide, starvation, and electrolyte

imbalances (APA, 2000; Birmingham et al., 2005; Sharp & Freeman, 1993). Starvation entails an immediate risk to the cardiovascular and renal systems (Mitchell & Crow, 2010; Sharp & Freeman, 1993). In addition, a range of cardiac complications can occur (as a result of either starvation or self-induced vomiting), including bradycardia, tachycardia, hypotension, mitral valve prolapse, systolic and diastolic ventricular dysfunction, and cardiac failure (Schocken, Holloway, & Powers, 1989; Sharp & Freeman, 1993). Individuals with anorexia nervosa are also at a particularly heightened risk of osteoporosis, endocrine complications, and metabolic complications (Mitchell & Crow, 2010; Sharp & Freeman, 1993).

Long-term outcomes for eating disorders are not entirely clear, however existing research indicates significant variation in outcome across individuals. In regards to anorexia nervosa, early research investigating a sample of 100 women with the disorder reported a good outcome for approximately half of individuals, an intermediate outcome for 30 per cent, and a poor outcome for 20 per cent of individuals (Hsu, Crisp, & Harding, 1979). A more recent synthesis of a large body of research indicated a good outcome for less than half of individuals with anorexia nervosa, some improvement in approximately 30 per cent, and a chronic course for approximately 20 per cent of individuals (Steinhausen, 2002). Other researchers have also estimated 10 to 20 per cent of cases of anorexia nervosa to be chronic and unremitting (Fairburn et al., 2008). In regards to bulimia nervosa, another large synthesis of research indicated that, in the five to 10 years following presentation, approximately half of the women had fully recovered from bulimia nervosa, 30 per cent continued to experience bulimic symptoms, and 20 per cent continued to meet full criteria (Keel & Mitchell, 1997).

Outcomes are clearly variable across individuals, and a number of characteristics have been associated with poorer outcomes. In anorexia nervosa, vomiting, other purging behaviours, obsessive compulsive features, mood and anxiety disorders,

substance abuse, poorer social functioning, and longer duration of illness before presenting for treatment have been associated with poorer outcomes (Berkman, Lohr, & Bulik, 2007; Herpertz-Dahlmann et al., 2001; Steinhausen, 2002, 2009). In bulimia nervosa, mood and anxiety disorders, substance use, poorer impulse control, poorer body image, impaired psychosocial functioning, more disturbed eating behaviours, and longer duration of the illness before presenting for treatment have also been associated with poorer outcomes (Ben-Tovim et al., 2001; Berkman et al., 2007; Keel & Mitchell, 1997; Keel, Mitchell, Miller, Davis, & Crow, 1999; Keller, Herzog, Lavori, Bradburn, & Mahoney, 1992; Steinhausen, 2009). These findings suggest that both anorexia nervosa and bulimia nervosa are likely to be chronic for a significant subset of cases. In addition, although many individuals may recover from their specific disorder, residual symptoms are common (Fairburn et al., 2003). Given the distressing symptoms, serious psychological and medical risks, and potentially chronic course of illness, continued research aimed at understanding, preventing, and treating these serious conditions is strongly warranted.

1.2 The Association Between Anxiety and Eating Disorders

The fact that anxiety and eating disorders are frequently comorbid argues for the possible existence of shared maintenance factors (such as intolerance of uncertainty). A number of clinical and epidemiological studies have indicated a high lifetime rate of comorbid anxiety disorders for women with eating disorders (Blinder, Cumella, & Sanathara, 2006; Godart, Flament, Perdereau, & Jeammet, 2002; Kaye, Bulik, Thornton, Barbarich, & Masters, 2004). Research undertaken by Kaye and colleagues (2004) found almost two-thirds of a large eating disorder sample to have one or more lifetime anxiety disorders – a rate far higher than that for community samples of women, for which a best-estimate lifetime rate of anxiety disorders has been reported as

18.5%, based on numerous epidemiological studies (Somers, Goldner, Waraich, & Hsu, 2006).

High comorbidity rates have also been reported between eating disorders and a range of specific anxiety disorders, including obsessive-compulsive disorder, generalised anxiety disorder, and social anxiety disorder (Godart et al., 2006; Godart et al., 2003; Kaye et al., 2004). While further research is needed to clarify the temporal pattern of the comorbidity, studies suggest that anxiety disorders may frequently precede the development of an eating disorder (Bulik, Sullivan, Fear, & Joyce, 1997; Deep, Nagy, Weltzin, Rao, & Kaye, 1995; Godart et al., 2003; Kaye et al., 2004; Raney et al., 2008). Comorbid anxiety has also been associated with a more severe clinical presentation and poorer outcomes for individuals with eating disorders (Berkman et al., 2007; Dellava et al., 2010; Fichter & Quadflieg, 2004; Herpertz-Dahlmann et al., 2001; Raney et al., 2008; Thompson-Brenner & Westen, 2005). Based on these indications, an increased understanding of the role of anxiety-related constructs in the eating disorders context appears warranted.

A range of constructs implicated in anxiety appear conceptually relevant to eating disorders, and their establishment as shared features is likely to foster generalisations across disorders. A number of such variables have been recognised and well-researched in the eating disorders field (e.g., perfectionism), but many others are yet to receive adequate investigation (e.g., experiential avoidance). Intolerance of uncertainty is proposed as a potentially shared feature across anxiety and eating disorders, which is yet to receive significant research attention. Although intolerance of uncertainty has recently been identified as a possible transdiagnostic maintaining factor for anxiety disorders (Carleton, 2012; Carleton, Sharpe, & Asmundson, 2007; Carleton et al., 2012; McEvoy & Mahoney, 2011; Starcevic & Berle, 2006), limited research has

considered whether intolerance of uncertainty may also be a maintaining factor for eating disorder symptoms.

1.3 Non-Specific Factors and Eating Disorder Symptoms

The extant literature investigating the development and maintenance of eating disorder symptoms has predominantly focused on the examination of disorder-specific variables, that is, variables specifically related to eating, weight, and shape. While this is useful and necessary, specific factors alone do not adequately account for eating disorder development, maintenance, or treatment outcomes. This does not discount the importance of specific factors, such as weight and shape concerns, which are central to the diagnostic criteria for eating disorders and current maintenance models of eating disorder symptoms. Indeed, specific factors are instrumental in eating disorders, such as an over-evaluation of eating, shape, and weight and their control, which has been postulated as fundamental to both the diagnosis and maintenance of eating disorder pathology (Fairburn et al., 2003).

Theoretical and empirical work suggests the role of factors other than concerns about eating, shape, and weight in the aetiology of eating disorders, and such work has been suggested that inattention to these factors has limited treatment effectiveness (Fairburn et al., 2003; Fletcher, Kupshik, Uprichard, Shah, & Nash, 2008; Schmidt & Treasure, 2006). This highlights the potential role of "non-specific" factors in eating disorder development and maintenance, that is, factors that are not specifically related to eating, weight, and shape. Contributing evidence for the role of non-specific factors was reported in research by Fletcher and colleagues (2008), which assessed patients referred to an eating disorder unit. In their study, Fletcher and colleagues found that features of general psychopathology (e.g., interpersonal sensitivity) emerged as important aspects of an eating disorder presentation. Indeed, non-specific factors appeared to be more salient than specific factors in the patients' self-reports. Other

research has also provided support for the examination of non-specific factors, reporting the prevalence of anorexia nervosa as not limited to individuals with shape and weight concerns or individuals who are exposed to the thin-ideal (Keel & Klump, 2003; Schmidt & Treasure, 2006).

Research investigating the involvement of non-specific factors in the maintenance of eating disorder symptoms is increasing. Meyer, Waller, and Walters (1998) acknowledged the importance of looking beyond specific factors, and instead focused on the relationship between eating disorders and more general emotional states. Fairburn and colleagues (2003) also recently acknowledged the role of non-specific factors by revising and extending their original theory of the maintenance of bulimia nervosa to include four non-specific maintaining mechanisms for all eating disorders, namely, clinical perfectionism, core low-self-esteem, mood intolerance, and interpersonal difficulties. In addition, a recent maintenance model proposed by Schmidt and Treasure (2006) conceptualised several non-specific factors (e.g., perfectionism/cognitive rigidity) as particularly prominent in the maintenance of anorexia nervosa.

Greater consideration of non-specific factors is likely to have important implications for treatment, which has also focused more predominantly on specific factors relating to eating, shape, and weight (e.g., Fairburn, Shafran, & Cooper, 1998). Initial research evidence has suggested that targeting relevant non-specific factors may increase the effectiveness of treatment for eating disorders (Fletcher et al., 2008). Furthermore, research which has compared both specific and broader cognitive-behavioural eating disorder treatments has found that a subset of individuals display an improved response to a broader treatment which addresses additional, non-specific maintaining mechanisms (Fairburn et al., 2009). These findings highlight the importance of addressing non-specific factors in future research in the eating disorders

context. As indicated above, a particular non-specific factor considered worthy of investigation with regards to eating disorder symptoms is intolerance of uncertainty.

1.4 Definition and Characteristics of Intolerance of Uncertainty

Uncertainty may be considered as a "circumstance whereby a particular event or situation cannot be structured or categorized because of insufficient information" (Rosen et al., 2007, p. 413). While people typically maintain a preference for certainty (Koerner & Dugas, 2008), individual differences exist in general tolerance of uncertainty. Some individuals are reasonably accepting of uncertainty (and may even embrace it), yet other individuals are especially resistant to uncertainty and may experience uncertainty as highly uncomfortable. The specific construct of intolerance of uncertainty was first proposed in the literature by Freeston and colleagues (1994). Although the precise definition varies across researchers, intolerance of uncertainty has been conceptualised as a tendency or predisposition to perceive uncertainty as negative or threatening and to react to uncertainty with various (typically negative) emotional, cognitive, and behavioural responses (Boelen & Reijntjes, 2009; Buhr & Dugas, 2006; Grenier et al., 2005). The characteristic appraisal of uncertainty is often emphasised, with researchers delineating intolerance of uncertainty as "the tendency for an individual to consider the possibility of a negative event occurring as unacceptable and threatening" (Carleton, Sharpe, & Asmundson, 2007, p. 2308). Carleton (2012) recently sought to further clarify the definition of intolerance of uncertainty, describing the construct as "representing, at its core, a dispositional fear of the unknown" (p. 939). Intolerance of uncertainty was initially introduced in the literature pertaining to worry, but is increasingly being considered as a feature associated with anxiety in general (Carleton, Sharpe, & Asmundson, 2007; Holaway, Heimberg, & Coles, 2006). Cross-cultural investigation has postulated intolerance of uncertainty as a reasonably universal

construct (Norton, 2005), and theoretical and empirical work suggests that the construct is gender non-specific (Freeston et al., 1994; Robichaud, Dugas, & Conway, 2003).

A high intolerance of uncertainty is considered to be maladaptive, and may produce considerable distress and impairment. For an individual with a high intolerance of uncertainty, the experience of uncertainty can induce a range of distressing physical, emotional, and cognitive reactions (Buhr & Dugas, 2002; Freeston et al., 1994; Greco & Roger, 2001, 2003; Leite & Kuiper, 2008). A high intolerance of uncertainty may heighten interpretations of threat, and induce somatic stress reactions, such as increased blood pressure (Greco & Roger, 2001, 2003). In addition, cognitive processes, such as problem-solving, can be impaired in response to uncertainty. For example, individuals may seek to immediately reduce their uncertainty at the expense of solving a problem effectively (Ladouceur, Talbot, & Dugas, 1997). Conversely, when decision-making is required, individuals with a high intolerance of uncertainty may seek more evidence before making a decision, thereby slowing the speed of decision-making (Ladouceur et al., 1997; Leite & Kuiper, 2008). Finally, individuals with a high intolerance of uncertainty may also maintain a tendency towards inaction or avoidance of situations that involve uncertainty, which is likely to result in functional impairment (Boelen & Reijntjes, 2009; Buhr & Dugas, 2002; Dugas et al., 1997). In a recent experiment, Thibodeau, Carleton, Gómez-Pérez, and Asmundson (2013) found a significant association between intolerance of uncertainty and decreased performance (slower speed) on a common, but somewhat complex, performance task (i.e., keyboard typing).

The relative content specificity of intolerance of uncertainty is yet to be fully understood. Several researchers have suggested that intolerance of uncertainty lacks content specificity, that is, it is postulated to generalise across contexts (e.g., Koerner & Dugas, 2008). According to this hypothesis, the core anxiety implicated in an intolerance of uncertainty is argued to relate directly to uncertainty – which occurs

across contexts. In support of this proposal, Koerner and Dugas (2008) found individuals with a high intolerance of uncertainty to appraise all types of uncertain situations as distressing, whereas individuals with a low intolerance of uncertainty indicated more distress in uncertain situations that related to specific worries. However, it is also possible that individuals with a high intolerance of uncertainty could demonstrate an exceptionally high intolerance of uncertainty in a particular domain. This possibility is yet to be adequately assessed, but has been alluded to by several researchers (e.g., Shafran, 2002). Research directly investigating the content specificity of intolerance of uncertainty is limited and, as such, further research is required to clarify this element of the construct. It therefore remains unknown as to whether any elevation in intolerance of uncertainty among individuals with eating disorder symptoms occurs across domains of uncertainty and/or is heightened in the domain of eating, shape, and weight.

The underlying dimensions of the intolerance of uncertainty construct are also yet to be clearly determined. Several researchers have attempted to clarify the construct's factor structure through exploratory and confirmatory factor analysis of the most common measure of intolerance of uncertainty, namely, the Intolerance of Uncertainty Scale (IUS; Freeston et al., 1994 [French Version]; Buhr & Dugas, 2002 [English Version]). While several large studies have provided support for the conceptualisation of intolerance of uncertainty as a multidimensional construct, a number of different factor structures have been put forward (Berenbaum, Bredemeier, & Thompson, 2008; Buhr & Dugas, 2002; Carleton, Norton, & Asmundson, 2007; Freeston et al., 1994; Norton, 2005). Initial exploratory principal components factor analysis of the original measure reported a five-factor structure as most appropriate (Freeston et al., 1994), however, authors of the English translation reported a four-factor structure (Buhr & Dugas, 2002). In further investigation, Norton (2005) conducted

exploratory factor analysis on samples varying in ethnicity and found inconsistent structures across groups, which were attributed to characteristics of the IUS, rather than cross-cultural differences.

More recent exploratory factor analysis has suggested four factors, namely, desire for predictability (which refers to a strong preference to know what will happen in the future), inflexible uncertainty beliefs (which refers to strongly held, negative beliefs relating to uncertainty), uncertainty paralysis (which refers to a tendency to be "frozen into inaction" by uncertainty), and uncertainty distress (which refers to a tendency to respond to uncertainty with distress) (Berenbaum et al., 2008). Berenbaum and colleagues (2008) showed discriminant validity for these factors through differential associations with related constructs. Desire for predictability was strongly (positively) associated with scores on the desire for predictability, discomfort with ambiguity, and preference for order subscales of the Need for Closure Scale (NCC; Webster & Kruglanski, 1994); inflexible uncertainty beliefs was associated with lower levels of openness to experience and higher levels of close-mindedness; uncertainty paralysis was strongly (negatively) associated with extraversion and the decisiveness subscale of the NCC; and uncertainty distress was strongly (positively) correlated with neuroticism. The desire for predictability and uncertainty paralysis factors are reasonably comparable to the prospective anxiety and inhibitory anxiety scales respectively described by Carleton, Norton, and Asmundson (2007) and appear to be the most stable and replicable factors, observed in varying forms across multiple studies (Berenbaum et al., 2008, Buhr & Dugas, 2002; Carleton, Norton, & Asmundson, 2007).

A confirmatory factor analysis conducted by McEvoy and Mahoney (2011) compared five previously identified models, and found the two-factor version identified by Carleton, Norton, and Asmundson (2007) to be the best fitting model. McEvoy and Mahoney (2011) labelled these factors as prospective intolerance of uncertainty

(comparable to the prospective anxiety and desire for predictability factors identified by previous researchers) and inhibitory intolerance of uncertainty (comparable to the inhibitory anxiety and uncertainty paralysis factors identified by previous researchers). The two-factor model showed excellent internal reliability, convergent validity through correlations with various anxious and depressive symptoms, and discriminant validity for each subscale through differing relationships with a range of clinical symptoms. For example, prospective intolerance of uncertainty was uniquely associated with worry and obsessive-compulsive symptoms, whereas inhibitory intolerance of uncertainty was uniquely associated with symptoms of social anxiety, panic disorder, and depression (McEvoy & Mahoney, 2011). Carleton (2012) further clarifies this distinction, describing prospective intolerance of uncertainty as the "cognitively focused" dimension of intolerance of uncertainty, and inhibitory intolerance of uncertainty as the "behaviourally focused" dimension. Despite preliminary support for a two-factor model, continued debate persists regarding the structure of intolerance of uncertainty, and the current overlap does not allow for a clear, multidimensional depiction of the intolerance of uncertainty construct.

A final point worth noting is the conceptualisation of intolerance of uncertainty as similar but distinct from the construct termed "intolerance of ambiguity". Intolerance of uncertainty typically refers to uncertainty regarding future events or outcomes, whereas intolerance of ambiguity refers to perceived ambiguity in the present moment (Grenier et al., 2005). That is, intolerance of uncertainty tends to be future-oriented, whereas intolerance of ambiguity is present-oriented (Grenier et al., 2005). Buhr and Dugas (2006) suggested that the constructs comprise both shared and unique elements, and identified a number of features as more unique to intolerance of uncertainty (e.g., uncertainty paralysis and the belief that uncertainty is unfair) or intolerance of ambiguity (e.g., associated with clarity and conservativeness). In an empirical

investigation, Buhr and Dugas (2006) found the constructs to be moderately correlated but distinct, with intolerance of uncertainty judged as the more relevant construct in regards to worry, given its future-orientation and associated characteristics (Buhr & Dugas, 2006). A recent theoretical review of the distinction between the constructs was detailed by Carleton (2012), who noted that intolerance of ambiguity appears to reflect a more immediate perspective in fearing the unknown, whereas intolerance of uncertainty appears to reflect a more distant perspective. On the basis of a further review of the constructs as conceptualised throughout previous literature, Carleton (2012) suggests that clinical research and practice should continue the focus on intolerance of uncertainty, as opposed to intolerance of ambiguity, particularly given the strong evidence base implicating uncertainty in heightened anxiety and the perception of threat.

1.5 Intolerance of Uncertainty Across Clinical Disorders

The intolerance of uncertainty construct has been investigated to varying degrees in relation to a range of clinical disorders and associated symptoms. In early research, intolerance of uncertainty was suggested to play a fundamental role in the development and maintenance of problematic worry (Dugas et al., 1997; Dugas, Gagnon, Ladouceur, & Freeston, 1998; Freeston et al., 1994). Empirical research has supported this proposal, and intolerance of uncertainty has been found to predict unique variance in worry beyond a range of other constructs, including cognitive avoidance, beliefs about worry, and negative problem orientation (Lachance, Ladouceur, & Dugas, 1999; Robichaud et al., 2003). In addition, an experimental manipulation of intolerance of uncertainty found that the induction of a high intolerance of uncertainty led to higher levels of catastrophic worry (Meeten, Dash, Scarlet, & Davey, 2012). Intolerance of uncertainty has also been linked with generalised anxiety disorder more broadly (e.g., Buhr & Dugas, 2012; Ladouceur, Blais, Freeston, & Dugas, 1998).

Research initially focused most strongly on the link between intolerance of uncertainty and worry, however intolerance of uncertainty is increasingly being considered as a feature of anxiety in general (e.g., Holaway et al., 2006), and appears to be present across the anxiety disorders (Carleton, 2012; Carleton et al., 2012; Ladouceur et al., 1999). Indeed, aetiological models have identified intolerance of uncertainty as a potential risk factor for the development of anxiety disorders generally (Dugas et al., 1998; Holaway et al., 2006; Norton, Sexton, Walker, & Norton, 2005) and recent research has strongly supported the role of intolerance of uncertainty as a fundamental dispositional, vulnerability factor underlying all anxiety disorders, as well as depression (Carleton, 2012; Carleton et al., 2012; Carleton, Sharpe, & Asmundson, 2007). Carleton, Sharpe, and Asmundson further suggest that, while the underlying basis of intolerance of uncertainty may be shared amongst disorders, an individual's mechanisms for coping with an intolerance of uncertainty may determine their particular clinical disorder. For instance, in some individuals, an underlying intolerance of uncertainty may prompt rumination about social events or avoidance of social situations in an attempt to appease an intolerance of uncertainty, thereby producing a symptom profile consistent with the specific diagnosis of social anxiety disorder.

In accordance with these conceptualisations linking intolerance of uncertainty to anxiety disorders in addition to generalised anxiety disorder, increasing evidence has indicated a strong association between intolerance of uncertainty and obsessive-compulsive disorder and associated symptoms (Dugas et al., 2001; Gosselin et al., 2008; Holaway et al., 2006; Tolin, Abramowitz, Brigidi, & Foa, 2003). Gosselin and colleagues (2008) proposed that an increased tendency to perceive uncertainty as threatening may prompt doubt about future negative consequences, in addition to worry, thereby predisposing individuals to develop either symptoms of generalised anxiety disorder or obsessive compulsive disorder. Indeed, intolerance of uncertainty has been

linked with several obsessive-compulsive features, including excessive doubt and checking behaviours (Dugas et al., 2001; Holaway et al., 2006; Tolin et al., 2003). Intolerance of uncertainty has further been posited as an important mediator of checking behaviour (Lind & Boschen, 2009; Overton & Menzies, 2005), and a treatment for compulsive checking behaviour found that changes in intolerance of uncertainty were strongly related to improvements in checking (Overton & Menzies, 2005).

Studies have also shown intolerance of uncertainty to be involved in a number of other clinical disorders. Boelen and Reijntjes (2009) found intolerance of uncertainty to predict unique variance in social anxiety beyond the inclusion of negative affect, fear of negative evaluation, and anxiety sensitivity. In addition, Carleton, Collimore, and Asmundson (2010) found comparable levels of intolerance of uncertainty in individuals reporting symptoms indicative of social anxiety disorder and generalised anxiety disorder. A relationship has also been observed between intolerance of uncertainty and symptoms of depression, particularly rumination (Dugas, Schwartz, & Francis, 2004; McEvoy & Mahoney, 2012; Yook, Kim, Suh, & Lee, 2010), and tentative links have been reported between intolerance of uncertainty and features of psychosis (Broome et al., 2007; White & Gumley, 2010).

1.6 Measurement of Intolerance of Uncertainty

Several measures have been developed to assess intolerance of uncertainty. The Intolerance of Uncertainty Scale (IUS; Freeston et al., 1994 [French Version]; Buhr & Dugas, 2002 [English Version]) is a 27-item self-report questionnaire that assesses the extent to which uncertainty is experienced as intolerable. More specifically, the measure assesses an individual's emotional, cognitive, and behavioural reactions to uncertainty, attempts to control the future, and inability to act in the face of uncertainty (Freeston et al., 1994). The English translation, developed by Buhr and Dugas (2002), was translated and back-translated from the original French version to ensure it

accurately reflected the original measure. Psychometric analysis of the IUS has reported excellent internal consistency, convergent and divergent validity through correlations with worry, anxiety, and depression, and criterion-related validity through the ability to differentiate high and low non-clinical worriers (Freeston et al., 1994) and individuals meeting full, partial, or no criteria for generalised anxiety disorder (Buhr & Dugas, 2002).

Despite promising findings in the initial analyses, the construct and factorial validity of the IUS has received criticism as mentioned previously (Carleton, Norton, & Asmundson, 2007; Norton, 2005). Norton (2005) analysed data from several large samples, and reported a weak factorial structure and inconsistency across four cultural groups, which was argued to be due to redundancy and a lack of relatedness between items. Furthermore, Carleton, Norton, and Asmundson (2007) employed confirmatory factor analysis to evaluate previously reported unitary, four-, and five-factor models. Carleton, Norton, and Asmundson found none of the models to appropriately fit the data, and instead proposed a two-factor solution for a shortened version of the IUS, consisting of prospective anxiety and inhibitory anxiety. Exploratory factor analysis later employed by Sexton and Dugas (2009) using a conceptually driven approach also identified two factors, referring to the beliefs that "uncertainty has negative behavioural and self-referent implications" and "uncertainty is unfair and spoils everything". Differential associations were found between the two subscales and various symptoms of emotional disorders (Sexton & Dugas, 2009). Given the aforementioned debate regarding the underlying structure of intolerance of uncertainty and the continuing ambiguity concerning the factors of the IUS, several researchers have delineated the current, most appropriate use of the IUS to be as a unifactorial measure (Buhr & Dugas, 2002; Freeston et al., 1994; Norton, 2005).

In response to research indicating the IUS to have an unstable factor structure, Carleton, Norton, and Asmundson (2007) developed a reduced, 12-item version of the original scale, the Intolerance of Uncertainty Scale Short Form (IUS-12). The set of items from the original measure was reduced through analysis of inter-item correlations, factor loadings, and extant theory. The psychometric analyses indicated that the IUS-12 displays high internal consistency, a high correlation with the full IUS (r = .96), and correlations as expected with related measures of anxiety and worry (Carleton, Norton, & Asmundson, 2007). A two-factor structure representing prospective anxiety and inhibitory anxiety was reported. Khawaja and Yu (2010) utilised clinical and non-clinical samples to compare the psychometric properties of the full IUS (Buhr & Dugas, 2002) and the IUS-12 (Carleton, Norton, & Asmundson, 2007). Both scales showed good internal consistency, satisfactory test-retest reliability, satisfactory concurrent validity (evidenced by a significant correlation with worry and trait anxiety), discriminant validity (distinguishing the clinical and non-clinical sample), and predictive validity (for the prediction of pathological worry and trait anxiety). The reliability of the full IUS was slightly better than the IUS-12, however the IUS-12 was acknowledged as being more economical (Khawaja & Yu, 2010).

The development of the IUS-12 resulted in a clearer factorial structure, however a persistent criticism was reported by Gosselin and colleagues (2008). Gosselin and colleagues (2008) suggested the IUS to evaluate general reactions to uncertainty, rather than the actual tendency to consider uncertainty to be intolerable or unacceptable. Gosselin and colleagues further argued that the intolerance of uncertainty construct, defined as "the excessive tendency of an individual to consider it unacceptable that a negative event may occur, however small the probability of its occurrence" (Dugas et al., 2001, p. 552), is yet to be properly measured. In response, Gosselin and colleagues (2008) conducted four studies to develop and validate a new measure of intolerance of

uncertainty, the Intolerance of Uncertainty Index (IUI). The IUI is a 45-item self-report questionnaire that consists of two parts: Part A measures the tendency to consider uncertainties to be unacceptable, whereas Part B measures six cognitive and behavioural manifestations of intolerance of uncertainty, including overestimation of the probability that a negative event will occur, avoidance, worry, reassurance-seeking, doubt, and control. The items of Part A were designed to explicitly evaluate intolerance of uncertainty in accordance with the aforementioned definition. Initial psychometric analyses indicated excellent internal consistency, good convergent validity through moderate to large correlations with the IUS (r = .46 - .72) and associated constructs, and initial support for a six-factor structure of Part B of the IUI (Gosselin et al., 2008). Carleton, Gosselin, and Asmundson (2010) examined the psychometric properties of a back-translated English version of the IUI and suggested item refinement and a reduced, three-factor structure for Part B. While the measure is very promising, additional investigation into the psychometric properties of the measure would be valuable for supporting its use in future research. It is also important to consider the context in which the measure is used. Carleton (2012) considers the IUI to be most usefully applied as a clinical and outcome measure for worry, whereas the IUS-12 is described as most useful for researching the nature of intolerance of uncertainty across different contexts.

In addition to self-report measures of intolerance of uncertainty, behavioural assessments have also been proposed. In a recent study by Sternheim, Startup, and Schmidt (2011), a behavioural component was included, in addition to assessment using the IUS. The researchers sought to measure intolerance of uncertainty behaviourally through the use of a data-gathering, probabilistic reasoning task, adapted from the "Beads" task developed by Huq, Garety, and Hemsley, (1988). In the study by Sternheim and colleagues (2011), a computerised version of this task was employed in

which participants were presented with a jar containing beads of two or three different colours. Participants were provided with a number of possible ratios of coloured beads in the jar (e.g., 85:15 or 15:85 red to green), and were required to determine the correct ratio of beads by drawing as many beads as necessary, one by one, from the jar. The degree of difficulty was varied by adjusting the possible ratios and the number of colours included in the jar. The authors described these tasks as reflective of varying degrees of uncertainty, since uncertainty is strongly associated with probability and harder tasks involve greater uncertainty (Sternheim et al., 2011). However, the number of beads chosen did not correlate with scores on the IUS. Previous research by White and Mansell (2009) also failed to find a significant relationship between the beads task and intolerance of uncertainty scores, however other research has found a relationship (e.g., Broome et al., 2007; Ladouceur et al., 1997). These discrepant findings could be due in part to the conflicting strategies that may be employed by individuals with a high intolerance of uncertainty. For example, some individuals may require more evidence before making a decision in order to increase their sense of certainty (resulting in a higher number of beads drawn), whereas other individuals may attempt to make a decision very quickly in order to avoid the prolonged experience of uncertainty (resulting in a lower number of beads drawn). These different coping strategies may preclude observation of a consistent relationship between intolerance of uncertainty and behaviour in the beads task. In addition, it may be argued that ambiguity is manipulated in this task, rather than uncertainty. On the basis of these considerations, the beads task is not recommended for use as a behavioural assessment of intolerance of uncertainty. Indeed, Sternheim and colleagues (2010) acknowledge the importance of developing more ecologically valid tasks to measure intolerance of uncertainty.

1.7 Evidence for the Causal Status of Intolerance of Uncertainty

Research investigating psychological variables and their relationship with clinical disorders or symptoms often relies on self-report and correlational research. While this research is useful, experimental investigation adds an important element to understanding the role of a construct in a given disorder. Experimental paradigms can elucidate the specific relationships between variables through the determination of causal pathways. Ladouceur, Gosselin, and Dugas (2000) note that, "the experimental manipulation of a variable allows a better definition and clearer understanding of the interaction between this and other related variables" (p. 938). In addition, de Bruin, Rassin, and Muris (2006) and Holaway and colleagues (2006) have argued that further research employing an experimental manipulation of intolerance of uncertainty is needed to better understand the nature and function of the construct for individuals displaying problematic worry, generalised anxiety disorder, and obsessive compulsive disorder. This argument can also be extended to the need for experimental research investigating intolerance of uncertainty as it presents for individuals displaying eating disorder symptoms.

Only a small number of studies have experimentally manipulated intolerance of uncertainty in any context and have found preliminary support for a causal role. These manipulations have predominantly occurred with the intention to assess a causal relationship between intolerance of uncertainty and worry (Grenier & Ladouceur, 2004; Ladouceur, Gosselin, & Dugas, 2000; Meeten et al., 2012). In addition, two related studies have manipulated intolerance of uncertainty in the health psychology context to investigate the impact on health monitoring, information seeking, and worry (Rosen & Knäuper, 2009; Rosen et al., 2007). A detailed discussion of each of these studies is provided in Chapter 4.

Treatment studies provide further evidence suggestive of the role that intolerance of uncertainty may have in maintaining psychopathology. Several recently developed cognitive-behavioural treatment approaches in the anxiety disorders field have included a component targeting intolerance of uncertainty. These treatments have most commonly aimed to increase tolerance of uncertainty in order to reduce worry, and have shown good treatment efficacy in this regard (Dugas & Ladouceur, 2000; Dugas & Robichaud, 2007; Ladouceur, Dugas, et al., 2000). The inclusion of an intolerance of uncertainty treatment component has been found to lead to both (a) a reduction in intolerance of uncertainty, and (b) a reduction in worry and anxiety (Dugas & Ladouceur, 2000; Ladouceur, Dugas, et al., 2000). Ladouceur, Dugas, and colleagues (2000) assessed a cognitive behavioural treatment for generalised anxiety disorder which included a component targeting intolerance of uncertainty, and found the treatment to lead to a significant decrease in intolerance of uncertainty, which was maintained at 6- and 12-month follow-ups. Furthermore, a meta-analysis of cognitive behavioural therapy for pathological worry in generalised anxiety disorder found treatments using this protocol to show larger effect sizes than a range of other treatments (Covin, Ouimet, Seeds, & Dozois, 2008). Similar treatment programs addressing intolerance of uncertainty have also been found to reduce symptoms of other anxiety disorders, in addition to generalised anxiety disorder. A cognitive behaviour group therapy program for social phobia, which included an emphasis on tolerating uncertainty, found reductions in intolerance of uncertainty to be associated with reductions in social anxiety symptoms (Mahoney & McEvoy, 2012). Such treatments have not yet been applied in the eating disorders field, however Sternheim and colleagues (2011) have acknowledged the potential utility of a treatment component designed to increase resilience to uncertainty in the treatment of anorexia nervosa. Carleton (2012) also recommended continued exploration into the transdiagnostic

potential of intolerance of uncertainty treatments, and the application of such a treatment to the eating disorders context would further inform this investigation.

It is also noteworthy that a high intolerance of uncertainty may itself have a number of important implications for clinical treatment, irrespective of its role in symptom maintenance. Individuals with a high intolerance of uncertainty may strive to avoid acknowledging problems or engaging in therapy, due to a high motivation to avoid uncertainty (Leite & Kuiper, 2008). Leite and Kuiper (2008) further note that individuals with a high intolerance of uncertainty may spend excessive time in a "contemplation" stage of change, that is, contemplating the advantages and disadvantages of change, due to the inherent uncertainty associated with change. This possibility may be particularly relevant for the eating disorders context, since low motivation for change is often expressed by eating disorder patients (Blake et al., 1997; Casasnovas et al., 2007; Martinez et al., 2007; Rieger et al., 2002; Vitousek et al., 1998).

1.8 Intolerance of Uncertainty and Eating Disorders

The specific construct of intolerance of uncertainty has only recently been considered in the eating disorders field, however the concept has been alluded to in the literature for a number of years. In 1990, Vitousek and Hollon hypothesised that "weight control may be appealing to the eating-disordered patient not only because it promises her the certainty of success... [but also] the certainty that quantifiable feedback about her progress toward it will be available every morning on the bathroom scale" (Vitousek & Hollon, 1990, p. 208). Along a related vein, Shafran (2002) noted that individuals with anorexia nervosa typically restrict their range of food and may not be able to tolerate the uncertainty associated with a new food with an uncertain impact on their weight. More recently, researchers have also alluded to the possibility of a "heightened sensitivity to uncertainty" in individuals with anorexia nervosa, postulated

to trigger the use of eating disorder behaviours (such as purging) as an attempt to reduce the corresponding distress (Raney et al., 2008, pp. 330-331).

To date, only a small body of research has directly investigated intolerance of uncertainty in the context of eating disorders or eating disorder symptoms. Furthermore, there have been no studies that have experimentally manipulated intolerance of uncertainty in order to examine the impact on eating disorder symptoms. Rather, the studies have been primarily correlational or qualitative in nature. Initial research by Konstantellou and Reynolds (2010) investigated the role of intolerance of uncertainty and meta-cognitions in a non-clinical sample, and found that individuals with problematic eating attitudes scored significantly higher on the IUS than individuals with normal eating attitudes. In further research, Sternheim and colleagues (2010) investigated the experience of uncertainty for nine patients with severe anorexia nervosa through the use of focus groups. Patients reported uncertainty as stressful and described actively trying to minimise the potential for uncertainty. Uncertainty was reported across disorder-related areas (e.g., food, eating, and weight gain) and non-eating disorder areas, including family and friends, work, daily chores, and future aspirations. Participants also reported their eating behaviours to become more severe in the face of uncertain situations. A more detailed discussion of this study is provided in Chapter 2.

Several studies have found that individuals with anorexia nervosa and bulimia nervosa report significantly higher scores on the IUS than healthy controls (Frank et al., 2012; Sternheim et al., 2011). In a study by Sternheim and colleagues (2011), patients with anorexia nervosa scored significantly higher on the IUS than patients with bulimia nervosa, who in turn scored significantly higher than a control group. Sternheim and colleagues (2011) also included a data-gathering, probabilistic reasoning task (as described above, see section 1.6). Both eating disorder groups found the task more distressing than the control group. More specifically, patients with bulimia nervosa

reported feeling more uncertain and less confident in their decisions, whereas patients with anorexia nervosa attributed higher importance to making the correct decision. Patients with bulimia nervosa requested more information (i.e., beads) before making a decision than the other two groups, however the interpretation of this finding is unclear, as the task is not considered to be a clear and direct reflection of intolerance of uncertainty (see section 1.6 for a more detailed discussion).

In another recent investigation, Konstantellou, Campbell, Eisler, Simic, and Treasure (2011) tested a cognitive model of generalised anxiety disorder in the eating disorders context, and found that individuals with an eating disorder both with and without comorbid generalised anxiety disorder scored significantly higher than controls on the IUI, lending support to a possible role of intolerance of uncertainty in the eating disorders context, independent of anxiety. Konstantellou and colleagues (2011) advocated for consideration of intolerance of uncertainty in the assessment and formulation of eating disorders, and noted that a treatment component targeting intolerance of uncertainty may improve treatment responsiveness and outcome for certain individuals.

Conclusions have not yet been drawn regarding the content specificity of the intolerance of uncertainty construct. Some research findings suggest that a high intolerance of uncertainty generalises across contexts, yet it is also possible that an intolerance of uncertainty may narrow into the context of a specific disorder for a given individual. In regards to eating disorders, Shafran (2002) noted that a high intolerance of uncertainty could relate specifically to the content areas of food, weight change, and shape change, which is displayed via characteristic eating disorder behaviour, such as frequent weight- and shape-checking and a strong desire to know the caloric content of food. However, Sternheim and colleagues (2010) found eating disorder patients to describe significant distress in conjunction with uncertainty across both eating disorder-

specific areas and non-specific areas (e.g., career and interpersonal relationships). Thus, additional research is needed to clarify the content specificity of the construct in the context of eating disorder symptoms.

1.9 Constructs Relevant to the Association Between Intolerance of Uncertainty and Eating Disorder Symptoms

Understanding the nature of the relationship between intolerance of uncertainty and eating disorder symptoms is likely to be enhanced through a consideration of potentially associated variables. Indeed, Sternheim and colleagues (2011) identified investigation into the link between intolerance of uncertainty and more peripheral features of eating disorders, such as perfectionism, rigidity, and the desire for control, as important avenues for future research. The following section outlines a number of variables theorised to be relevant to the relationship between intolerance of uncertainty and eating disorder symptoms.

Among the variables that may be potentially involved in an association between intolerance of uncertainty and eating disorder pathology is negative affect. Previous theoretical and empirical research has linked negative affect with the development and maintenance of eating disorder symptoms (Cassin & von Ranson, 2005; Cooley & Toray, 2001; Kaye et al., 2004; Stice, 2001; Stice & Agras, 1998; Stice, Killen, Hayward, & Taylor, 1998). Binge eating in particular has been described as a coping response employed to soothe negative affect (Alpersa & Tuschen-Caffier, 2001; Fairburn et al., 2003; Whiteside et al., 2007). Previous research has also found intolerance of uncertainty to be associated with, and elicit, negative affect (Buhr & Dugas, 2006; Greco & Roger, 2003; Sexton & Dugas, 2009), and researchers have recently identified covariation between intolerance of uncertainty, negative affect, and eating disorder symptoms, however the direction of influence in these relationships

remain unclear (Frank et al., 2012). Thus further empirical research investigating these interrelationships is needed.

Perfectionism may also be relevant for understanding any relationship between intolerance of uncertainty and eating disorder features. Elevated levels of perfectionism have commonly been observed in individuals with anorexia nervosa and bulimia nervosa (Bulik et al., 2003, Cassin & von Ranson, 2005; Halmi et al., 2000; Kaye et al., 2004). The two subscales of the Frost Multidimensional Perfectionism Scale (FMPS; Frost, Marten, Lahart, & Rosenblate, 1990) that have shown the strongest relationship with eating disorder symptoms are the Concern Over Mistakes and Doubting of Actions subscales (Bulik et al., 2003; Minarik & Ahrens, 1996). Frost and colleagues (1990) define Concern Over Mistakes as "negative reactions to mistakes, a tendency to interpret mistakes as equivalent to failure, and a tendency to believe that one will lose the respect of others following failure" (p. 453). This may amplify an intolerance of uncertainty, since individuals who appraise a mistake as particularly negative are likely to be highly distressed by the characteristically uncertain possibility of such an occurrence. In contrast, Doubting of Actions is defined as "the tendency to feel that projects are not completed to satisfaction" (Frost et al., 1990, p. 453). This construct also bears a conceptual similarity to intolerance of uncertainty, given that individuals who persistently question whether their actions are satisfactory are, by definition, hypervigilant to uncertainty in this specific domain, and are likely to experience difficulty tolerating the (uncertain) possibility that their actions have not (or will not) be satisfactory. Less research has investigated the link between intolerance of uncertainty and perfectionism, yet preliminary research suggests that there may indeed be an association between these constructs (Buhr & Dugas, 2006). Although future research is required, perfectionism is considered a potentially relevant factor in examining the relationship between intolerance of uncertainty and eating disorder symptoms.

The associations between low self-esteem and both eating disorder symptoms and intolerance of uncertainty suggest that self-esteem may also be relevant for understanding intolerance of uncertainty in the eating disorder context. Low self-esteem has been found to co-occur with aspects of eating disorder symptoms (Button, Loan, Davies, & Sonuga-Barke, 1997; Gual et al., 2002; Meijboom, Jansen, Kampman, & Schouten, 1999). Related constructs, such as a low sense of agency, have also been found to be elevated in individuals with anorexia nervosa and bulimia nervosa (Dalgleish et al., 2001). While extant research is limited, low self-esteem is also theorised to correspond with a high intolerance of uncertainty. Indeed, the related construct of low self-efficacy has been suggested as a potential contributor to an intolerance of uncertainty since a perceived inability to respond effectively to uncertain or unpredictable situations is likely to augment a high intolerance of uncertainty (Koerner & Dugas, 2008). Further research is required to clarify the relationship between self-esteem and intolerance of uncertainty, and to consider a possible role for low self-esteem in the link between intolerance of uncertainty and eating disorder symptoms.

Obsessive-compulsive disorder (OCD) and features of OCD are frequently implicated in eating disorders, and high rates of OCD have been reported in eating disorder samples (Cassin & von Ranson, 2005; Kaye et al., 2004). Indeed, in a large eating disorder sample (n = 672), OCD was the most commonly reported comorbid disorder, with a lifetime occurrence of OCD reported by approximately 41% (n = 277) of the sample (Kaye et al., 2004). Several symptoms typically identified in OCD are also commonly observed in eating disorders, and empirical research has linked both ordering and cleaning compulsions with eating disorder symptoms (Humphreys, Clopton, & Reich, 2007). The most common OCD symptom argued to occur in individuals with eating disorders is the need for symmetry, order, and exactness

(Shafran, 2002). Obsessive-compulsive personality traits have also been linked with eating disorder symptoms and suggested as a possible maintaining factor for anorexia nervosa (Lavender, Shubert, de Silva, & Treasure, 2006; Pallister & Waller, 2008; Schmidt & Treasure, 2006). In addition, a high intolerance of uncertainty has been associated with a number of features of OCD, such as checking compulsions, rigidity, and ritualistic behaviour (Ciarrochi, Said, & Deane, 2005; Steketee, Frost, & Cohen, 1998; Tolin et al., 2003). Based on these relationships, obsessive-compulsive features may be relevant in the link between intolerance of uncertainty and eating disorder symptoms.

The need for control is another important component of the presentation of an eating disorder, and may also be linked to intolerance of uncertainty. Vitousek and Hollon (1990) note that individuals with eating disorders appear "daunted by the ambiguity and confusion of the adult world, and strive desperately to restore a sense of predictability, control, and personal efficacy to their lives" (p. 206). Indeed, control appears to be a pervasive theme in eating disorders (Serpell, Treasure, Teasdale, & Sullivan, 1999). Eating disorders are argued to offer "the promise of control", since the perception of control in the domain of eating, shape, and weight relates to attributes of the self rather than external constituents (Vitousek & Hollon, 1990, p. 193). Konstantellou and Reynolds (2010) speculate that the need for control, which manifests itself in terms of control of eating, shape, and weight, could develop from a high intolerance of uncertainty, however this possibility is yet to be empirically investigated.

A final construct that may be noteworthy in understanding the intolerance of uncertainty and eating disorder association is that of experiential avoidance, which refers to the condition whereby "a person is unwilling to remain in contact with particular private experiences (e.g., bodily sensations, emotions, thoughts, memories, behavioral predispositions) and takes steps to alter the form or frequency of these events

and the contexts that occasion them" (Hayes, Wilson, Gifford, Follette & Srosahl, 1996, p. 1154). Although research has only recently begun to establish an association between eating disorders and experiential avoidance (e.g., Rawal, Park, & Williams, 2010; Schmidt & Treasure, 2006), a substantial body of research has linked eating disorder symptoms with an intolerance of negative mood states (e.g., Anestis, Selby, Fink, & Joiner, 2007; Corstorphine, 2006; Corstophine, Mountford, Tomlinson, Waller, & Meyer, 2007; Fairburn et al., 2003; Harrison, Sullivan, Tchanturia, & Treasure, 2009). Emotional avoidance, avoidant coping, and avoidant personality traits have also been linked with eating disorders (Cassin & von Ranson, 2005; Corstophine et al., 2007; Ghaderi & Scott, 2001; Mayhew & Edelmann, 1989; Troop, Holbrey, Trowler, & Treasure, 1994). In addition, eating disorder behaviours have been identified as a mechanism for avoiding awareness of distressing emotions (Anestis et al., 2007; Corstorphine, 2006; Fairburn et al., 2003). Research is yet to investigate a possible association between experiential avoidance and intolerance of uncertainty, however the conceptualisation of intolerance of uncertainty is theoretically consistent with a component of experiential avoidance, given that individuals with a high intolerance of uncertainty tend to avoid uncertainty and the perceived negative emotional state associated with being uncertain. In summary, the existence of a number of constructs that are associated with both intolerance of uncertainty and eating disorder symptoms (i.e., negative affect, perfectionism, low self-esteem, obsessive-compulsive features, need for control, and experiential avoidance) argue for an association between the two, and are suggestive of possible mechanisms underlying such a relationship.

1.10 Theoretical Models of Intolerance of Uncertainty and Eating Disorder Symptoms

Despite the various pathways that may link an intolerance of uncertainty and eating disorder symptoms, a thoroughgoing theoretical framework for understanding

how intolerance of uncertainty may be relevant for the development and/or maintenance of eating disorder pathology has yet to be developed. In contrast, intolerance of uncertainty has been included in models of anxiety disorders (e.g., Dugas et al., 1998). The established theoretical arguments for a role of intolerance of uncertainty in the anxiety disorders context may provide insight into the conceptualisation of intolerance of uncertainty in the eating disorders context.

Dugas and colleagues (1998) proposed a cognitive model of generalised anxiety disorder (GAD) specifying worry, the primary component of GAD, to be maintained by four factors, namely, intolerance of uncertainty, erroneous beliefs about worry, poor problem orientation, and cognitive avoidance. More specifically, intolerance of uncertainty is proposed to result in worry due to a heightened focus on uncertain events, which are correspondingly perceived as more dangerous or threatening, resulting in increased "what if" questioning (Dugas et al., 1998; Ladouceur et al., 1997). Given that both worry and GAD have been found to be elevated in eating disorders (Godart et al., 2003; Sassaroli et al., 2005), the model developed by Dugas and colleagues (1998) suggests that an indirect influence of intolerance of uncertainty in the eating disorders context may be indicated. However, an intolerance of uncertainty may also relate to eating disorder symptoms more directly. Konstantellou and colleagues (2011) acknowledged this possibility and investigated the applicability of the aforementioned cognitive model in a sample of individuals with eating disorders. Konstantellou and colleagues (2011) found individuals with an eating disorder both with and without comorbid GAD to score higher than controls on all four components of the GAD model. That is, even individuals with an eating disorder who did not meet criteria for GAD exhibited a heightened intolerance of uncertainty, suggestive of a direct relationship between intolerance of uncertainty and eating disorders.

Several maintenance models of eating disorders suggest the mechanisms through which an intolerance of uncertainty may correspond more directly with eating disorder symptoms. Among these is the dual-pathway model of bulimia nervosa which proposes that thin-ideal internalisation contributes to body dissatisfaction, which in turn induces dieting and negative affect, both of which subsequently increase the risk of binge eating and related compensatory behaviours such as purging (Stice, 2001; Stice & Agras, 1998). The role of negative affect in this model may be particularly relevant for consideration. More specifically, negative affect is hypothesised to increase the likelihood of eating disorder symptoms in this model, because eating disorder behaviours (e.g., binge eating) can provide comfort and distraction from negative emotions (Stice, 2001, 2002; Stice & Agras, 1998; Stice, Akutagawa, Gaggar, & Agras, 2000). Indeed, a large body of research has identified binge eating as a mechanism for alleviating negative mood states (e.g., Alpersa & Tuschen-Caffier, 2001; Whiteside et al., 2007). Stice (2001) recommended future research to consider additional variables that may contribute to expression of the factors specified in the dual-pathway model, including negative affect. Such an investigation is likely to be valuable for treatment, since research has found the experimental reduction of factors in the model to result in a reduction in eating disorder symptoms (e.g., Burton, Stice, Bearman, & Rohde, 2007). Intolerance of uncertainty is correspondingly proposed as a possible, additional contributor to negative affect in the model. Through this pathway, intolerance of uncertainty may increase the likelihood of eating disorder symptoms through the mediating role of negative affect. Indeed, as outlined earlier, previous research has found a heightened intolerance of uncertainty to elicit negative affect, yet research is needed to investigate this hypothesis in the eating disorders context.

A second relevant model for consideration is a maintenance model of restricting anorexia nervosa proposed by Schmidt and Treasure (2006). The model is comprised of

four maintaining factors, including perfectionism/cognitive rigidity, experiential avoidance, pro-anorectic beliefs, and the responses of close others. The model does not emphasise weight- and shape-related factors, however Schmidt and Treasure note that the three non-specific factors included in their model still tend to mesh with specific eating disorder features. For example, experiential avoidance may present via a specific avoidance of food for individuals with anorexia nervosa. Intolerance of uncertainty may be proposed as an additional maintaining factor, which may be comparable in specificity. That is, an intolerance of uncertainty may also mesh with specific eating disorder features, and present specifically in the domains of eating, weight, and shape. The relative content specificity of intolerance of uncertainty is worthy of further investigation.

Schmidt and Treasure's (2006) maintenance model highlights a number of potential pathways through which intolerance of uncertainty may serve to maintain eating disorder symptoms. Firstly, the model suggests that eating disorder symptoms may be maintained by beliefs about the positive function of the disorder. That is, anorexia nervosa is postulated to fulfil various functions, such as eliciting care from close others (Schmidt & Treasure, 2006). A high intolerance of uncertainty may prompt an additional pro-anorectic belief specifying anorexia nervosa as a helpful tool for increasing a sense of certainty. Secondly, Schmidt and Treasure (2006) highlight perfectionism and cognitive rigidity as manifestations of obsessive-compulsive traits in anorexia nervosa. Intolerance of uncertainty has also been implicated in obsessive-compulsive disorder (Ciarrochi et al., 2005; Steketee et al., 1998; Tolin et al., 2003). Intolerance of uncertainty may therefore be conceptualised as another potential manifestation of an obsessive-compulsive trait. Schmidt and Treasure also highlight all-or-nothing thinking and a fear of making mistakes as potential outcomes of perfectionism and rigidity. Indeed, an intolerance of uncertainty is similarly likely to

show an association with all-or-nothing thinking and a fear of making mistakes, as individuals may seek to avoid the uncertainty associated with "grey areas" and be distressed by the uncertainty of a potentially negative outcome of making a mistake. Finally, individuals with a high intolerance of uncertainty often seek to actively avoid uncertainty and the associated negative affect, which may be conceptualised as an additional facet of experiential avoidance in this maintenance model. Each of these proposed pathways requires investigation.

A final model of interest is a transdiagnostic cognitive-behavioural model of eating disorders developed by Fairburn and colleagues (2003). This model delineates the core psychopathology of eating disorders to involve a "cognitive disturbance characterised by the over-evaluation of eating, shape and weight and their control" (Fairburn et al., 2003, p. 522). Indeed, the overvaluation of shape and weight is widely considered as central to the development and maintenance of eating disorder symptoms (e.g., Fairburn, 2008; Fairburn et al., 2003; Killen et al., 1996; Killen, Taylor, et al., 1994). The model further describes additional psychopathology, including dietary restraint, other forms of weight-control behaviour, preoccupation with thoughts about shape and weight, and intolerance of negative affect, as core maintaining mechanisms which stem from and reinforce the core psychopathology (Fairburn, 2008; Fairburn et al., 2003). Finally, several additional, non-specific maintaining processes are also proposed to interact with the core mechanisms and create an obstacle to change, including clinical perfectionism, core low self-esteem, and interpersonal difficulties (Fairburn, 2008; Fairburn et al., 2003). In this model, a general intolerance of uncertainty may be conceptualised as another potential, non-specific maintaining mechanism which interacts with the core mechanisms to maintain eating disorder symptoms. Conversely, an intolerance of uncertainty specifically in the domain of eating, shape, and weight may be conceptualised as a more specific maintaining factor.

Further examination of the content specificity of intolerance of uncertainty is needed to assess these possibilities. Overall, this model comprises a number of benefits, including a transdiagnostic formulation and applicability for a wide range of eating disorder presentations based on the distinction between core and additional features. As such, the proposed role of intolerance of uncertainty in this conceptualisation is considered particularly worthy of future research attention.

1.11 Summary

In summary, intolerance of uncertainty is proposed as a possible, non-specific maintenance factor for eating disorder symptoms. While previous research has identified intolerance of uncertainty as strongly implicated in anxiety disorders, limited research has investigated its role in the eating disorders context. The high comorbidity between anxiety and eating disorders supports the possibility of shared maintenance factors, such as an intolerance of uncertainty. In addition, a number of constructs have been identified as potentially relevant to a link between intolerance of uncertainty and eating disorder symptoms, including negative affect, perfectionism, low self-esteem, obsessive-compulsive features, need for control, and experiential avoidance. Intolerance of uncertainty has only recently been investigated in the eating disorders context, yet preliminary research is supportive of a relationship between these constructs. Moreover, a small body of research has examined a causal role of intolerance of uncertainty in affecting worry and health monitoring behaviours, however no research has experimentally investigated intolerance of uncertainty to examine its effect on eating disorder symptoms. The conceptualisation of intolerance of uncertainty as a maintaining factor for eating disorder symptoms is likely to fit within several current eating disorder maintenance models. However, while a possible role of intolerance of uncertainty as a maintenance factor for eating disorder symptoms is

supported by theoretical arguments, empirical research is required to provide a more thoroughgoing investigation of this proposal.

Chapter 2: Study One - Investigating the Experience of Uncertainty Among Inpatients with an Eating Disorder

2.1 Introduction

The intolerance of uncertainty construct is yet to be adequately defined in the literature and the role of this phenomenon in the eating disorders context is even less clear. In addressing this, the current study aimed to explore the meaning and experience of uncertainty for individuals with an eating disorder. More specifically, the research intended to investigate the experience of uncertainty for women with an eating disorder diagnosis, including both their assessment of uncertainty and responses towards it. For the current study, the focus was restricted to patients currently undergoing inpatient treatment for an eating disorder. Within these parameters, variation in the type and course of illness was actively sought to add richness and depth to the understanding of the uncertainty experience, as it exists across individuals.

Gaining insight into the perspectives of patients themselves provides a number of benefits. Given the well-documented tenuous motivation for change and ambivalence about recovery expressed by many patients with an eating disorder (Blake et al., 1997; Casasnovas et al., 2007; Martinez et al., 2007; Rieger et al., 2002; Vitousek et al., 1998), a greater understanding of patients' perspectives may assist in adapting treatment to motivate the patient in a way that is meaningful to her or him. If uncertainty is perceived as highly distressing for patients, an understanding of the contributors to such distress and mechanisms for coping may allow for more meaningful, targeted, and effective treatment. The inclusion of a treatment component addressing an issue that is meaningful to patients may also encourage engagement in further treatment specifically targeting eating, weight, and shape concerns.

The method through which an intolerance of uncertainty may contribute to the development or maintenance of an eating disorder is yet to be established. The current

study aimed to consider patients' experiences with reference to the course of their illness, allowing insight into the potential chronology of the relationship between an intolerance of uncertainty and eating disorder symptoms. Such information provides an initial basis for understanding whether intolerance of uncertainty acts as a cause and/or consequence of eating disorder pathology.

2.1.1 Application of qualitative methodology. Quantitative methodology is undoubtedly essential for psychological research, however qualitative methods can contribute a depth and richness of analysis that is difficult to achieve through quantitative methods alone. As Haslam and McGarty (2003) suggest, "there is 'more' to... phenomena than can be conveyed by mere numbers and by crude attempts to manipulate discrete aspects of the environment one at a time" (p. 353). The sole use of quantitative methods to gain a comprehensive understanding of complex psychological constructs is often insufficient, with qualitative methods providing unique value and utility.

The utility of qualitative methods is evident in their ability to portray the complexity of phenomena and obtain a deeper sense of a construct for particular individuals. Haslam and McGarty (2003) recognise qualitative methods as particularly useful for purposes such as (a) understanding a phenomenon as it is experienced by, and has meaning for, the people involved and (b) investigating the natural occurrence of the phenomenon. Especially given the lack of previous research shedding light on this phenomenon, qualitative research methodology was considered to be highly applicable for achieving the objective of the current research study, namely, to investigate the lived experience of uncertainty for women with eating disorders.

Another particularly salient advantage to qualitative research pertains to the examination of variation. Qualitative research respects variability in the meaning and experience of a construct both within and between individuals (Haslam & McGarty,

2003), which is essential for the current research since although all eligible participants must have a diagnosed eating disorder and be receiving inpatient treatment, the experience of uncertainty for each patient is likely to be unique. Quantitative research carries the risk of reducing this complexity to the identification of one or two common patterns. While this can be beneficial for certain purposes, it relinquishes insight into the richness of each patient's unique experience.

Both qualitative and quantitative methods have their strengths and weaknesses, yet their combination – when applied appropriately – may allow for exploitation of the benefits of each method. This initial qualitative study aims to explore the self-described cognitions, affect, and behaviours associated with uncertainty for women with a diagnosed eating disorder. It is expected that these findings will provide the basis for further study employing a quantitative methodology.

2.1.2 Replication and extension of previous research. The current study replicated certain components of a previous study conducted by Sternheim and colleagues (2011), but entailed a number of noteworthy differences. Sternheim and colleagues (2011) explored the experience of uncertainty for nine patients with anorexia nervosa through the use of focus groups. Three groups were conducted across inpatient, rehabilitation, and day care settings. Interpretative Phenomenological Analysis (IPA) was utilised to analyse the data. Uncertainty was identified across both eating- and non-eating-related areas, such as future aspirations and others' evaluations in interpersonal situations. Participants experienced uncertainty as stressful and described actively attempting to avoid or minimise uncertainty. Given this was the first study of its kind, replication of the research is considered necessary. Furthermore, the sample consisted exclusively of patients with anorexia nervosa. As such, it is unclear whether such findings can be extended to patients with differing eating disorder diagnoses. Finally, the study by Sternheim and colleagues (2011) obtained information regarding patients'

experiences with uncertainty at the present moment in time. Additional investigation into prior experiences with uncertainty (before and since onset of the eating disorder) is likely to be beneficial in obtaining further insight into the distinct features of the experience of uncertainty for individuals with an eating disorder, including suggestions of the role of intolerance of uncertainty as a causal, maintaining, and/or outcome factor for eating disorders.

In line with Sternheim and colleagues (2011), the aim of the current study was to elucidate a deeper understanding of uncertainty in the eating disorder context. The current study further intended to extend this research by incorporating women with different types and severity of illness within the eating disorders domain. In addition, one-to-one, semi-structured interviews, rather than focus groups, were chosen as the best instrument for achieving these aims. The research by Sternheim and colleagues (2011) obtained nine participants across three focus groups, with each focus group lasting approximately 30-45 minutes. The application of similar resources to the delivery of one-to-one interviews was expected to result in slightly fewer participants overall. However, such detailed interviews were also expected to produce a richer understanding of each participant's ascribed meaning and responses to uncertainty. Thus, while individual interviews may sacrifice comment from a larger number of participants, they allow for richer exploration and a deeper understanding of the individual experiences of each participant.

2.1.3 The use of IPA and sample considerations. IPA was the method of analysis employed in the current study primarily for two reasons, namely (a) the applicability and utility of the method in consideration of the current research design, and (b) for additional consistency in replication and extension of the study conducted by Sternheim and colleagues (2011). IPA is designed to "explore in detail how participants are making sense of their personal and social world" (Smith & Osborn, 2008, p. 53). It

aims to gather detailed information for a specific subset of individuals. As outlined by Smith and Osborn (2008), the intention of IPA is to, "say something in detail about the perceptions and understandings of this particular group rather than prematurely make more general claims" (p. 55), which clearly aligns with the aims of the current study, as detailed below.

IPA is, by nature, only applied to small sample sizes. Smith and Osborn (2008) note, "a distinctive feature of IPA is its commitment to a detailed interpretative account of the cases included and many researchers are recognising that this can only realistically be done on a very small sample" (p. 56). Varying recommendations have been made for a sample size of one up to six (see Smith, 2004; Smith & Osborn, 2008). Smith and Osborn highlight the potential risk of an insufficiently penetrating analysis when obtaining a larger sample and copious amount of data. A small sample size permits more highly detailed examination of variation within and between individual cases – a fundamental goal of the current study.

The composition of the sample was designed to be homogenous insofar as each individual was to be a current inpatient at a designated eating disorder unit. There was, however, an intention to obtain a sample with variation amongst participants in the nature and course of the disorder. Such differences are valuable for developing a richer understanding of what is likely to be a complex relationship between uncertainty and eating disorder symptoms.

In sum, it was considered most beneficial to wholly align with a qualitative approach, delving into greater depth with fewer participants to obtain a richer analysis, rather than obtaining more participants, and thereby sacrificing depth. While smaller samples are limited in terms of being less representative of the population of interest, greater representation is a more reasonable goal of quantitative research. The value of this is not dismissed, however. The benefits of quantitative methods are firmly

acknowledged and expected to be utilised through their application in the subsequent studies of the current research program.

2.1.4 Aims of the present study. The aim of this initial study was to investigate the experience of uncertainty for women with a diagnosed eating disorder across the course of illness. The study aimed to extend previous research by Sternheim and colleagues (2011) by investigating the experience of uncertainty for participants with differing severity, type, and stage of illness within the eating disorders domain as well as using one-to-one interviews to attain a greater depth of analysis. Variation across presentations was considered valuable, adding to the richness of the data. Participants' reflections on their experiences with uncertainty before and after onset of the eating disorder were also investigated. These aims were addressed through the use of one-to-one semi-structured interviews exploring participants' experiences with uncertainty.

2.1.5 Research questions of the present study. In conducting a study with the intention to apply interpretative phenomenological analysis, Smith and Osborn (2008) suggest that research questions are best framed broadly. With this consideration in mind, the research questions to be addressed in the current study included:

1. What forms of uncertainty are most prevalent for women with eating disorders? How do women with eating disorders describe their experience of uncertainty?
2. What additional uncertainty presents for women with eating disorders in an inpatient unit? How do they perceive and respond to this uncertainty?
3. How do women with eating disorders cope with uncertainty?
4. What differences can be observed in the experience of uncertainty across different types and stages of illness?

2.2 Method

2.2.1 Participants. The study aimed to incorporate a sample with consistency in terms of all participants having a current, diagnosed eating disorder, yet variation in

terms of severity, type of illness, and stage of illness across participants. A clinical sample of women, each with an eating disorder diagnosis and currently residing at an inpatient unit, were recruited to participate. Standard international diagnostic criteria (*DSM-IV-TR;* APA, 2000) determined the diagnoses as made by treating practitioners at the inpatient unit. The sample included data from five women. The relevant clinical information for each participant is listed in Table 2.1. Participant identifiers are ordered according to descending length of illness, for ease of referencing results. Detailed participant information is provided in Appendix A.

Table 2.1

Participant Characteristics

Participant	Age	Eating Disorder Diagnosis	BMI	Length of illness
P1	26	EDNOS (BN)	24.9	11 years
P2	26	EDNOS (AN-B/P)	18.7	10 years
P3	18	AN-R	19.3	3 years
P4	20	AN-R	18.3	1 year
P5	18	AN-R	16.6	< 6 months

Note. EDNOS: Eating Disorder Not Otherwise Specified; BN: Bulimia Nervosa; AN-B/P: Anorexia Nervosa – Binge/Purge Subtype; AN-R: Anorexia Nervosa – Restricting Subtype; BMI: Body Mass Index.

2.2.1.1 Gender. The current sample was limited to participation by women only for two reasons, namely (a) due to the preponderance of women in the eating disorder population, and (b) to restrict the breadth of focus, given the design of the study and small sample size. While purposeful variation across course and type of illness was incorporated to add depth to understanding the experience of uncertainty, the inclusion

of men as an additional variation may have diluted the overall picture to the detriment of the research. The perspective of men is undoubtedly of interest, and is recommended for focus in future research.

2.2.1.2 Age. Participants were required to be aged 16 years or older. The age of the sample ranged between 18 and 26 years, with a mean age of 21.6 years ($SD = 4.10$).

2.2.1.3 Region of birth. All participants were born in Australia.

2.2.1.4 Living arrangements. All participants were currently residing at an inpatient unit, however information regarding their typical living arrangement was collected. All participants were living with parents and/or other family members prior to their admission.

2.2.1.5 Educational attainment and employment. In regard to the highest level of completed education, one participant cited Year 10, three participants cited Year 12, and the remaining participant had completed Year 10 and a Bachelor's Degree, without having completed Year 12. In regard to studying status, two participants were currently studying at university part-time, one participant was studying at university full-time, and the remaining two participants were not currently studying. In terms of employment, one participant was employed part-time or casually. The remaining four participants considered themselves either unemployed ($n = 2$) or not in the labour force ($n = 2$).

2.2.2 Measures. Demographic information was collected prior to commencement of the semi-structured interview (see Appendix B for the Initial Information form). The collected information included participants' age, country of birth, typical living arrangements, education, and employment background. In addition, data was gathered during the interview regarding participants' course of illness, history of treatment, comorbid diagnoses, and medication usage. Data pertaining to height and

weight were also collected from inpatient records in order to determine each participant's body mass index (BMI = kg/m2) at the time of participation.

The semi-structured interviews ranged in length from 25 to 60 minutes. The interviews aimed to elicit narratives relevant to the study aims and specific research questions. The interviews were audio-recorded and later transcribed. Further detail regarding the interview is included in the *2.2.3 Procedure* section below. The interview is attached in Appendix C.

2.2.3 Procedure.

2.2.3.1 Overview. Approval to conduct this study was obtained from the Australian National University Human Research Ethics Committee and the private hospital's ethics committee (see Appendix D for copies of approvals to conduct the research, the Information Sheet, Consent Form, and Debrief Sheet). A semi-structured interview was administered with each participant on a one-to-one basis. Informed consent and permission to audio-tape the interview was obtained from each participant. Participants were given the option to participate without audio-taping, however all participants consented to recording. The nature and limitations of confidentiality were discussed with participants, and each participant was agreeable to these stipulations.

2.2.3.2 Recruitment and debriefing of the sample. All participants were recruited from an inpatient unit at a private hospital in Sydney through purposeful sampling. In order to be eligible for participation, patients were required to be aged 16 years or older and female with a current diagnosed eating disorder. Flyers were posted at the hospital to inform patients as to the nature of the study (see Appendix E). Further to this, nursing staff approached patients to invite them to participate. Following participation in the study, patients were debriefed as to the nature of the research and provided with a written information sheet explaining the study with the contact details of the researchers and ethics committee for any further questions or concerns.

2.2.3.3 Rationale for the interview. The current study chose to administer one-to-one semi-structured interviews, in contrast to the previous study by Sternheim and colleagues (2011), which chose to utilise focus groups for their investigation. Sternheim and colleagues cited a number of advantages to the use of focus groups, namely patient familiarity with group settings, production of a comfortable environment, and the collection of richer data. A one-to-one, semi-structured interview was expected to match the first two advantages since semi-structured interviews allow for rapport-building with the respondent and the provision of empathy (see Smith & Osborn, 2008). Furthermore, a convincing argument was not made by Sternheim and colleagues for the production of richer data through focus groups given that each participant necessarily has less discussion time relative to individual interviews. A number of additional advantages to one-to-one interviews can, however, be identified, including (a) greater privacy to discuss issues candidly, (b) greater ability to explore specific areas that are meaningful to each participant, (c) a more comprehensive account from each participant generally, and (d) greater capacity for the respondent to introduce novel avenues for consideration (see Smith & Osborn, 2008). The advantage of privacy to result in candid discussion is considered particularly important for an inpatient setting, in which patients are familiar with each other and all relationships are unlikely to be entirely amicable (as noted by one participant during her interview).

A semi-structured interview was also chosen in preference to a structured interview. While a structured interview suggests advantages in terms of increased control and reliability (see Smith & Osborn, 2008), these are considered more likely to be of superficial benefit, rather than significantly enhancing the quality of the collected data. Disadvantages to a structured interview include potentially restricted breadth, complexity, and novelty of data obtained from each participant (see Smith & Osborn, 2008). Potential disadvantages of semi-structured interviews, as outlined by Smith and

Osborn, include their time-consuming nature, added difficulty in analysis, and reduced interviewer control. While these disadvantages pose challenges for the researcher, they are again of less concern in regard to their likelihood of influencing the quality of the collected data. Finally, the semi-structured interview is considered the exemplary method for interpretative phenomenological analysis (Smith & Osborn, 2008), which was the chosen method of analysis for the current study.

2.2.3.4 Development of the interview. A semi-structured interview schedule was produced in advance of data collection. The content of the interview schedule was originally based on the schedule described by Sternheim and colleagues (2011), however this was substantially extended to investigate the experience of uncertainty at different stages of illness, changes in the course of illness over time, and the experience of uncertainty associated with treatment. The funnelling technique outlined by Smith and Osborn (2008) was also applied to allow for the acquisition of each participant's general observations, along with a more detailed assessment regarding specific constructs of interest. Further suggestions outlined by Smith and Osborn regarding interview techniques were also applied, including neutral, open-ended questioning; minimal probing as required; guiding, rather than dictating, the interview direction; and monitoring the impact of the interview on the participant. The interview schedule was reviewed by a senior clinician in the area of eating disorders and revised accordingly. The final interview schedule is contained in Appendix C.

2.2.3.5 Delivery of the interview. Each interview was conducted by the primary researcher. Two requirements were set in consideration of ethics and cultivation of reflexivity, namely (a) the interviewer was required to be unfamiliar to the participant with no involvement in their clinical care, and (b) the interviewer's introduction was kept neutral and brief. Participants were informed that the interviewer was a

psychologist and researcher, from another state of Australia, investigating patients' experiences with uncertainty as part of a doctoral research program.

The primary role of the researcher was to ask the specific questions indicated by the schedule, with the additional provision of encouraging and supportive reflective statements (to build rapport and encourage a sense of ease for participants) and probing for clarification or elaboration of statements made by the participant. As recommended by Smith and Osborn (2008), the intention was to be suggestive in terms of interview direction, rather than prescriptive. Brief notes were made throughout the interview, however the audio-tapings were relied upon for full transcription to ensure the interviews could proceed without disruption due to note-taking. Interviews were restricted to a maximum duration of 60 minutes due to the vulnerable nature of the participants.

2.2.4 Data analysis. Data were analysed using interpretative phenomenological analysis. Refer to section 2.1.3 for a detailed discussion regarding this choice of method. Each interview was transcribed verbatim by the primary researcher. Two researchers independently coded the transcripts. Data was analysed inductively, with open coding applied to achieve the best fit of the data. Open coding involves the development of evolving codes or themes as the data is analysed, rather than application of a predetermined coding scheme (see Haslam & McGarty, 2003). Initial interpretations and themes were identified and discussed for each transcript. Variation across participants was examined through identifying convergence and divergence between the cases. Interpretations were discussed in face-to-face meetings between the two researchers. Discrepancies were resolved by clarifying the precise meaning of the theme and returning to specific extracts from the data to clarify the interpretation and adjust themes accordingly. The creation of super-ordinate themes was made through successive revisions by both researchers. Inter-rater reliability was high, with

reconciliation of the entire data set occurring after few brief dialogues. The process of analysis was documented throughout each step, creating an audit trail. Themes were referenced back to the original data set at multiple stages to ensure good fit.

2.3 Results

Analysis of the interviews produced five clusters or super-ordinate theme categories, namely (1) features and forms of uncertainty, (2) consequences of uncertainty, (3) uncertainty and coping, (4) uncertainty metacognitions, and (5) uncertainty across stages of the disorder. Table 2.2 shows the individual themes identified in the analysis within each cluster. A description of each theme is provided below, with corresponding verbatim extracts from the data.

Table 2.2

Themes

Features and forms of uncertainty
Pervasive and intense experience of uncertainty
Uncertainty regarding self and actions
Uncertainty regarding treatment and recovery
Uncertainty regarding others
Uncertainty regarding the future
Consequences of Uncertainty
Emotional reactions
Cognitive reactions
Physical reactions
Uncertainty and coping
Eating disorder behaviour
Information seeking, overcompensating, and denial
Avoidance and Paralysis
Rebellion
Adaptive coping strategies
Uncertainty Metacognitions
Uncertainty as distinctly negative
Uncertainty as inevitable
Acknowledging a positive component of uncertainty
Limited awareness of intolerance of uncertainty
Uncertainty across stages of the disorder
Intensification of the experience of uncertainty due to the eating disorder
Intensification of the eating disorder due to the experience of uncertainty
Variation in the experience of uncertainty across disorders and treatment stage

2.3.1 Features and forms of uncertainty. Five themes were identified within this cluster, reflecting the distinguishing features of the experience of uncertainty for participants, along with specific forms or types of uncertainty encountered by participants.

2.3.1.1 Pervasive and intense experience of uncertainty. All participants, with the exception of P5, reported experiencing a large degree of uncertainty in their lives, presenting across a range of circumstances. P5 (with the shortest course of illness) also identified instances of uncertainty, but these were not portrayed as all-encompassing, unlike for other participants. The pervasiveness of the uncertainty experienced by participants extended across both eating and non-eating related contexts. A snapshot of the range of uncertainty reported by participants is depicted in a comment by P1.

> Interviewer: "Can you tell me any more about what uncertainty is like for you – in your life right now with the eating disorder?"
>
> P1: "Uh... with the eating disorder... Will I ever get better? [laugh] Um... Will I be fat when I'm better? Uh, will I be overweight? What's gonna happen when it gets hot? [laughs] Um, won't be able to leave the house... Um, I don't know, lots of things... Will I be able to go back to uni? Will I ever get a job? Will I ever be able to work again? What if I go back to uni and make crap art?"

While one participant (P4) reported her uncertainty to be strongly focused within the eating disorder domain (e.g., the caloric content of foods she consumed or potential weight changes), most participants described instances of both eating-specific and general uncertainty (e.g., uncertainty regarding performance or others' opinions).

All participants tended to perceive their response to uncertainty as different from others to at least some degree, with some participants quite emphatic about this. Participants described their response to uncertainty as having become even more intense

with the eating disorder and described their mechanisms for coping with uncertainty as deviating from the norm (i.e., using eating disorder behaviour to cope).

2.3.1.2 Uncertainty regarding self and actions. Participants described a range of uncertainties regarding their own preferences, decisions, and behaviour. Some of these can be considered quite normative, such as uncertainty about a career path or whether to attend university, yet other instances of uncertainty related to a myriad of seemingly minor circumstances, as described by P4.

> Interviewer: "Can you think of a recent instance in which you experienced uncertainty? What was this instance?"
>
> P4: "Yeah, a million. Just even like picking dinner tonight - picking the sauce that goes on and what condiments I use, where I sit, what cup I use, how high I fill it, if I'll scam or not [laugh], yeah, everything."

Uncertainty regarding one's own decisions and behaviour was clearly strongest in relation to eating. Uncertainty about the calorie content or composition of food prompted subsequent uncertainty about which food to eat and whether food "should" be purged. Participants also described uncertainty regarding the "right" choice – with the belief that there is always a right choice. Such uncertainty was frequently referenced by P4.

> Interviewer: [After P4 stated multiple types of uncertainty] "What's the worst type of uncertainty?"
>
> P4: "Picking food is the worst."
>
> Interviewer: "What kind of uncertainty around that...?"

> P4: "Just... it's really hard to explain but just making the right choice... I don't know... I don't really know what that means, but probably the one lowest in, like, calories..."

Such concern appeared to be present prior to the eating disorder at a moderate level (e.g., making the right choice about what to wear), in the development of the eating disorder (e.g., making the right choice about what one is "meant" to eat), and more intensely with the eating disorder (e.g., making the right choice about what to eat for the lowest likelihood of weight gain). The magnitude of this concern was highlighted by P4 stating that she was so uncertain as to what she was meant to eat that she decided not to make a choice and, consequently, almost stopped eating altogether.

Two additional prominent themes of uncertainty related to the self were uncertainty regarding the ability to cope and a fear of the failure inherent in uncertain situations.

> P5: "I'm definitely uncertain about university - whether I'm gonna go to uni next year… I'm just not sure whether I'm gonna be up for it, like, I wanna do medicine in the long-term ... but, um, yeah, I just am uncertain about whether I'm gonna be able to cope."

The uncertainty associated with fear of failure involved such instances as waiting for results on an academic test or uncertainty about one's capability to complete an assignment to a high-distinction level. Participants appeared to be particularly attentive to signs of a possible negative outcome. In addition, this biased attention towards evidence for a negative *possibility* quickly translated into the perception of a *definite* negative outcome.

> P1: "...With me anyway... it's like a paranoia that something is not right or, um, something could happen and then 'could' turns into 'will'..."

This rapid progression from a *possibility* to a *definite* may result from the participant being unable or unwilling to tolerate uncertainty for an extended period without resolution.

2.3.1.3 Uncertainty regarding treatment and recovery. Another prominent source of uncertainty related to treatment for the eating disorder and included uncertainty regarding the direction and nature of treatment, as well as if or when recovery would occur. The experience of treatment itself appeared dominated by a host of uncertainties, and all participants referred to such uncertainty. Specific components of inpatient treatment exposed the participant to uncertainty, such as the provision of meals without information regarding their composition or calorie content, unconfirmed discharge dates, and being weighed without permission to know their weight.

> Interviewer: "Can you think of any other instances in which you have felt uncertain about something?"
>
> P1: "Um, even the whole day-to-day things, like um... I'm uncertain about when I'm leaving here and that bothers me because I don't know... what happens if I can't stay long enough or... um, I've been worried they're gonna put me in a share room and they did today... um I don't know, funny little things, um... if my weight's gone down from last week 'cause it went up last week."

P2 also described highly intolerable uncertainty associated with treatment. In her account – which was the same theme across participants – attention appeared to be biased towards the array of potentially negative outcomes, with little mention of any potentially positive outcomes of treatment.

P2: "There's just so much, I guess, uncertainty – especially when you're an inpatient because all that control's taken away from you ... it's like, oh, so much uncertainty, and I think that's why… why you're so anxious in here to begin with because, you know, you'll get put on this meal plan and you'll be… like, you don't know how many calories you've had, you don't know how your body's going to respond to it, if… where the weight's going, if it's um… if it's muscle or if it's fat or if it's, you know, like if it's fluid ... the uncertainty of not knowing what weight… what kind of weight it was - if it was fat - body fat, or water… um, that drove me insane [laugh]... And they don't tell you – they won't let you know the weight – so it's like I could've put on, like, so much and they won't tell me! You know, like, so yeah, they keep you very uncertain."

P5, with a short course of illness and admission of four weeks to date, reported uncertainty regarding the treatment itself and a corresponding difficulty with trusting the treatment providers. Possibly due to her short history, P5 was able to identify that this was likely to be "part of the eating disorder" rather than her own, genuine concern.

P5: "… I've had uncertainty, um, sort of over, like, you go from like not…, well in my case, like, restricting my diet so much and not eating and then I come in here and they give me this huge meal plan ... and you're just like oh my god, like, how can… like, how is this right? … so yeah it's sort of been hard to trust some of the stuff that the program sort of, like, what they want you to eat … yeah so I guess I've sort of been uncertain about that and my weight hasn't gone up, um, even though I seem to be eating heaps. Um, so yeah, I guess I've sort of had uncertainty about, like, the dietician, like, 'what are you doing?' [laughs] I guess she does know what she's doing so… yeah."

Interviewer: "So a bit of uncertainty about the treatment itself - whether it's the best for you?"

P5: "Yeah… yeah but I think that's just part of my eating disorder speaking really, I think, um, it's like, yeah, just sort of a trust thing..."

Another form of uncertainty experienced during treatment involved uncertainty about the world outside of the inpatient unit, and could trigger re-engagement in treatment due to the uncertainty about the "outside word" or, conversely, it could trigger an avoidant response, as referenced by P2 in her account of a thought process during treatment.

P2: "I'm just going to go back to my old ways, you know, like it's too much stress with the real world [laugh] and kind of uni and work and what I'm gonna do and I already feel like a failure and I feel like I'll fail it anyway so... um, I just get absorbed in my eating disorder again kind of."

2.3.1.4 Uncertainty regarding others. Participants also experienced a range of uncertainty regarding the social environment and interpersonal relationships, including uncertainty regarding others' thoughts or opinions, uncertainty regarding the meaning or "correct" interpretation of information or cues from others, and uncertainty about their own behaviour in social situations – how to behave and how that behaviour is interpreted. While most prominent during the eating disorder, this form of uncertainty was also identified during the period of recovery for P2 who described uncertainty about her partner being faithful and the future of her romantic relationship as highly distressing. Another participant (P1) described "not knowing" as particularly distressing in her interpersonal relationships.

2.3.1.5 Uncertainty regarding the future. Unsurprisingly, another source of uncertainty for participants related to uncertainty about the future and included both waiting for a specific outcome and general unknown future circumstances. Instances of uncertainty regarding a specific outcome related to many of the previously mentioned themes, such as uncertainty regarding recovery, academic grades, or changes in weight. General unknown future circumstances or "bigger-picture" uncertainty was also described by participants, with circumstances such as "not having a plan" described as contributing to the uncertainty experience. Uncertainty about the future appeared pervasive, described by participants both prior to and during the eating disorder, as well as during the period of recovery for P2.

A related form of uncertainty expressed by participants referred to the effect of a change. Identified examples included uncertainty regarding their body's reaction to food intake, such as during a binge or with the increased food intake associated with treatment, and uncertainty about their future self after treatment. Participants described distress in attempting to determine how many calories were absorbed during a binge and being uncertain of the type of weight gained during treatment (i.e., whether due to increased muscle mass, fat, or fluid). Uncertainty regarding the effect of a change was described both prior to and with the eating disorder and extended beyond the eating disorder context, such as – for P2 – uncertainty about the effect of her parents' divorce. Maturation fears were apparent in conjunction with uncertainty about the future, as described P3.

> P3: "Well you don't know what's going to happen to you with every year... You could suddenly be hit with a horrible disease, you could... I don't know, like, you can't determine what happens to your body as you get older, or what responsibilities you're gonna have to take on at what age so..."

2.3.2 Consequences of uncertainty. The three themes within this category corresponded to emotional, cognitive, and physical reactions to uncertainty. Behavioural reactions were considered in conjunction with methods of coping with uncertainty and are described in a subsequent theme.

2.3.2.1 Emotional reactions. Participants described a host of emotional reactions to uncertainty, the majority of which involved significant distress for participants. The most prominent emotions presented within the realm of anxiety and depression. Prevalent anxiety-based emotions included worry, fear, and panic. Other specific emotions identified included confusion, anger, and hopelessness. Aversive affective reactions in response to uncertainty were reported both prior to and after onset of the eating disorder. While the *type* of emotion occurring in response to uncertainty tended to be similar prior to and after onset of the eating disorder, the *intensity* of the emotion appeared heightened following onset of the eating disorder, with the use of more intense descriptors such as "dread" and "despair". The sole positive emotion reported in response to uncertainty was excitement, reported only by the participant with the shortest eating disorder history (P5), identified in relation to an upcoming overseas program.

2.3.2.2 Cognitive reactions. Negative cognitive responses to uncertainty were prominent across all participants, particularly in the form of biased thinking. Speculation, catastrophic thinking, jumping to conclusions, and assuming the worst were amongst the most common cognitive errors evident among participants. Negative speculation often referenced eating or weight and was explicitly linked with eating disorder behaviour, reflected in the comment by P3 below.

P3: "If I ate the food and didn't purge, would I blow up like a balloon?"

Speculation was also identified prior to the eating disorder but tended to be more balanced across positive and negative possibilities and the content of speculation was more normative (i.e., non-eating disordered). While a moderately negative reaction to uncertainty is considered reasonably normative, the reaction for the participants was of greater intensity. The strength of participants' cognitive reactions to uncertain situations led to a sense of paranoia for some participants. A clear pattern could be identified linking uncertainty, catastrophic thinking, and eating disorder behaviour. P2 described catastrophic thoughts in response to uncertainty, resulting in dietary restriction, laxative use, and substantial weight loss.

> P2: "[Following a binge episode] ...I was uncertain of how my body would react to that kind of behaviour because I thought in my head that I'm just going to blow up, like I'm going to gain weight kind of thing… Um… but surprisingly, I don't know how I didn't, but I lost almost 10 kilos… But I think that's because [I would] take heaps of laxatives after I've binged and do all these other compensating behaviours, so I think that's what prevented my weight, but yeah I was really uncertain. I was like oh my god I've eaten like a whole truck full of food [laugh] – I am going to put on heaps of weight. I was uncertain… I'd always convince myself that I was gonna gain heaps of weight so that would make me go do the compensatory behaviours, like I was always uncertain of how much my body would absorb during the binges..."

In addition to cognitive errors, processing difficulties were also apparent. Rumination was common, such as ruminating about what one's body may have absorbed during a binge, and some participants described a general difficulty in thinking clearly. Other cognitive impairment was observed in the form of biased attention. Partial evidence for a negative possibility was strongly attended to and the negative

outcome was feared. Conversely, partial evidence for a positive possibility was generally perceived as insufficient to reduce fear of an alternate, negative outcome, reflected in a situation described by P4. Staff had told her she had not gained weight, yet she believed she could see that she had gained weight. Without absolute certainty (i.e., knowing her exact weight) she assumed a catastrophic outcome.

> P4: "I also have a problem with uncertainty 'cause they don't tell us our weight. I think about that all the time 'cause I don't know..."
>
> Interviewer: "In your example of them not telling you your weight... What thoughts did you have or what did you say to yourself?"
>
> P4: "That they're making me really fat and just not telling me. Um... I just... 'cause they always say that I'm... my weight doesn't change but I know, like, I can see it and then I freak myself out because I don't know..."

Given that attention appears biased towards negative possibilities, a circumstance with two potentially negative outcomes is likely to exacerbate the negative response. P3 described such a "no-win" situation in regard to a component of treatment, namely, uncertainty about whether or not she would obtain approved leave from the hospital.

> Interviewer: "What thoughts did you have or what did you say to yourself?"
>
> P3: "Oh, well, I freak out because if I've gained, like if I get, um, leave it means I've gained weight and that makes me panic. And if I don't have leave, I haven't gained weight or haven't been doing the right thing so either way it's like a no-win situation."

Indecisiveness also presented as a common theme across participants. With uncertainty inherent in many decision-making processes, this was often avoided altogether. Uncertainty regarding the "right" choice, as described earlier, also appeared to contribute to indecision. Interestingly, for P5 with a shorter course of the disorder, indecision appeared more normative – such as difficulty making a decision about whether to pursue university studies. For participants with more entrenched eating disorders, indecision was pronounced in regard to food choices, but also described in other areas (e.g., university projects). Given the combination of indecisiveness and the risks associated with the illness, decisions were sometimes made for participants by others. While participants referenced a desire for control, some participants preferred when decisions were made for them.

2.3.2.3 Physical reactions. Physical reactions to uncertainty were reported by three of the five participants. Reactions included a tremor, increased heart rate, agitation, restlessness, and twitching. Each of these reactions occurred as part of an anxious response to uncertainty. The remaining two participants did not identify any physical sensations in response to uncertainty.

2.3.3 Uncertainty and coping. Five themes were identified within this category, reflecting the behavioural responses and coping methods employed by participants when faced with uncertainty. Coping methods were most often employed in an attempt to either reduce the uncertainty or soothe the corresponding anxiety.

2.3.3.1 Eating disorder behaviour. Eating disorder behaviour was described by participants as both an impulsive reaction to uncertainty and an intentional coping strategy employed to reduce the uncertainty or corresponding anxiety. This latter form was explicitly described by P3 as "using the eating disorder" to cope. Behaviours employed to cope with uncertainty included restricting, exercising, purging, laxative use, and binge eating. Eating disorder behaviours were often employed in a

compensatory manner with the aim to minimise uncertainty. Common forms of uncertainty leading to compensatory behaviours included uncertainty about how much food would be absorbed by a binge and uncertainty about weight gain after eating. Other eating disorder behaviours were not employed in a compensatory way, but rather as a behavioural reaction to the anxiety associated with uncertainty. P1, for example, described eating disorder behaviours employed in response to daily uncertainties, such as social interactions.

> P1: "...Like, I'm worried about the future stuff, but the uncertainty that I experience is more with like day-to-day, really little things - like interactions with people - that will set me off to want to purge."

P1 later described an instance of purging in such a scenario.

> P1: "If someone doesn't call me back... I... I don't know if this is uncertainty, but because I don't know what they're doing and why they have not called me back, they... they all must not like me and then I purge. Or I don't know if so-and-so likes me or I don't know if what I've said is offensive or um... everything really!"
>
> Interviewer: "And how does that help in that instance?"
>
> P1: "It's uh... purging for me at the moment is like, it's like impulsive, um, actually it's such a... it's relieving."
>
> Interviewer: "Relieves the anxiety?"
>
> P1: "Yeah."

As evident in the above example, eating disorder behaviours can be used to reduce the anxiety associated with being uncertain. In another instance, P2 described using binge

eating to cope with the uncertainty. For P2, binge eating allowed an escape or the opportunity to avoid facing the emotions evoked by the uncertainty. P1 also described restricting her eating in response to the anxiety induced by uncertainty.

> P1: "I was in a relationship when I was at a low weight, uh, for two years, and I lived with him and I spent the whole time - the whole two years - living in fear that he was going to break up with me. Um... and it fed my eating like crazy..."
>
> Interviewer: "In that you weren't eating?"
>
> P1: "I wasn't eating. I was so anxious I couldn't eat. Um... I was... um, at that time, like when I look back on it now, I literally sort of let myself wither away for this person, um, 'cause I was so worried about the relationship and I couldn't relax. It was awful, yeah ... It was just the... the not knowing that drove... drove me, well, mad [laugh]."

Dietary restriction was also employed in an effort to minimise uncertainty and was evident in various circumstances, such as not eating in response to uncertainty about the effect of a binge, or not eating when uncertain about the "right" food to eat, as described in an earlier theme. Instances of checking behaviour were also described in response to uncertainty, such as mirror checking in response to uncertainty about shape or weight. Rigidity and ritualised behaviours were also employed in an attempt to minimise uncertainty. In an example of this, P1 described eating the same foods each day and forbidding any interference with this, particularly during her period of anorexia nervosa. Another participant described cooking her own food to ensure she was certain of the content.

> P2: "When my mum cooked my meals, like, it was a kind of rule that my psychologist made that I had no, um, input in preparing the meals which freaked

me out and I always liked cooking my stuff separate 'cause I know exactly how much went in it… So yeah that uncertainty freaked me out - not knowing how many calories there were or… um… you know, um… or oil, like if she used oil, how much? ... I guess I wasn't certain of what was in it so I wanted to have as much input and sometimes I'd still I'd be like 'mum, I'm not having those veggies - I'm cooking my own' and she'd get the shits, but I'd be like 'I can't deal with it'..."

2.3.3.2 Information seeking and overcompensating. All participants described information seeking in an attempt to reduce their uncertainty. This was often employed in response to eating-related uncertainty and included strategies such as weighing and measuring food and attempting to determine the precise caloric content or composition of food being consumed. P2 described typical behaviour in this instance.

P2: "Sometimes I'd measure, like... my rice in, you know, a quarter of a cup measurement and stuff like that and sometimes weigh my food and stuff like that, um, to know the exact, like, calorie content and stuff like that..."

Information was also sought from the dietician in an effort to reduce uncertainty about weight. Information seeking was also employed in other areas. P5, with the shortest course of illness, described constructive use of information seeking by undertaking research to become better informed, reduce her uncertainty, and make decisions about her plans for the future. Another participant (P4) described looking to others and relying on their behaviour as a method of coping with uncertainty.

Overcompensating was employed in response to various forms of uncertainty and appeared present across stages of the illness. P2 described overcompensating in response to uncertainty about her romantic relationship during her period of recovery

from the eating disorder. She increased her investment in the relationship and spoke more highly of her partner when concerns about him were raised.

> P2: "I'd put in more in the relationship... I'd try and pick out his positives and, kind of, lift them up... Make excuses for him kind of thing..."

P4 described overcompensating in response to uncertainty about her university study, prior to development of the eating disorder.

> P4: I don't know if this is uncertainty but when I used to, like, study and things like I'd, sort of, get really anxious if I wasn't studying enough or... I don't know... does that count?
>
> Interviewer: [Yes.] What did you do to cope with the uncertainty?
>
> P4: I just studied every minute, yeah [laugh], as much as I could 'til I knew everything.

2.3.3.3 Avoidance and Paralysis. Various forms of avoidance and consequent paralysis in response to uncertainty were present across all participants. Such instances can be observed in earlier theme descriptions, such as the avoidance of eating or decision-making. The use of avoidance meant that, in some instances, other people made decisions or determined outcomes for the participants. Denial was also identified by participants. P2 described denial in response to uncertainty about her relationship.

> P2: "I think I kind of dealt with that more... just choosing to ignore it [laugh]... more avoidance... 'Nothing's wrong!' [laugh]. That's what I want so that's what I'm going to try and believe it's like."

Paralysis occurred when participants refrained from taking action due to fear of an unexpected catastrophic outcome. Unless a positive outcome was perceived as a certainty, a task may not be pursued at all.

> Interviewer: "Can you think of a recent instance in which you experienced uncertainty? What was this instance?"
>
> P1: "Um... If... if I don't know, even if, like I mean I'm never gonna know, but if I feel as though I'm not going to get a high distinction... then I won't do it."

This uncertainty was intensified by perfectionism and a fear of failure, and led to an inability to complete work due to the fear of a potentially negative outcome. Avoiding assessments, delaying tasks, and procrastination were all identified by participants as ways of responding to such uncertainty. A similar form of paralysis was described in the form of a hesitancy, preference, or inability to make plans for the future, due to the uncertainty involved.

> P5: [In regard to attending university] "I just am uncertain about whether I'm gonna be able to cope…"

Participants appeared to be impeded in setting goals due to the inherent uncertainty involved in setting and possessing goals. However, as P5 later described, this could also invoke uncertainty and distress.

> P5: "It's a bit stressful, um, to not know… sort of, to not have a plan can be a bit stressful…

Avoidance also led to impairment in daily functioning. P1 described this as heightened with anorexia nervosa, stating she "couldn't even order a cup of coffee" due to the array of uncertainties involved in the process. Other avoidant coping strategies

included medication and binge drinking. Avoiding or disengaging from particular friendships was also identified as an attempt to reduce the uncertainty involved in such friendships.

In a related vein, participants often spoke about uncertainty with a low sense of agency. While some instances of uncertainty were indeed outside of the participant's control, other instances were likely to be influenced to a degree by their own actions, yet the participant did not always acknowledge this.

> P3: "Well I'm just not sure [treatment] is actually gonna work. As I said I am terrified that I will never get better. 'Cause there is still a fairly big percentage of people who never do... so... I don't want to fall into that category but it could happen for all I know."

Participants also described simply not coping with uncertainty. P1 described a type of surrender to the uncertainty in this regard, consistent with a low sense of agency.

> Interviewer: "What did you do to cope with the uncertainty?"
>
> P1: "Mm, I'm sort of to the point now where I know there's not much I can do about it so... um, yeah I just feel anxious and that's it, yeah."

Interestingly, P5, with a shorter eating disorder history, reported a greater sense of agency than the other participants. While ultimately proving ineffective, P5 described employing a goal in the face of uncertainty - a distinctly different response to other participants.

> P5: "I guess I'm sort of uncertain about when I'm going home and when this is all going to, um, be over with. I… The other day we had the ward round and... I said to them, like, 'I have a goal – I want to go home for my birthday which is on [date]' Um… and they were like, 'no, that's not going to happen'..."

2.3.3.4 Rebellion. One participant (P2) identified rebellion as a response to uncertainty, occurring prior to the eating disorder and appearing to be more normative. She described uncertainty regarding her home life, attributed to her parents' busy lives running multiple businesses and the lengthy dissolution of their marriage. She described her response to this uncertainty as rebellious, such as going out with friends and engaging in risky behaviour. She reflected on this, stating, "I probably responded to it like most teenagers would..." This is in stark contrast to the strategies she later employed with the eating disorder, including binge eating, dietary restriction, and purging.

2.3.3.5 Adaptive coping strategies. Maladaptive strategies dominated participants' responses to uncertainty, however a wide range of adaptive coping strategies were also described. Support-seeking in response to uncertainty was identified by all participants and included examples such as talking with nurses or participating in groups run at the hospital. Social support appeared to provide reassurance and positive reinforcement, which reduced the perceived degree of uncertainty, particularly interpersonal uncertainty. Interestingly, P5 explicitly identified positive reinforcement from her social environment as protecting her from uncertainty about her body image prior to the eating disorder. P3 reported seeking social support prior to the eating disorder, but not since onset, as she believed that others would not understand her concerns with the eating disorder.

Other adaptive strategies presented during later stages of treatment, including positive self-talk, which appeared to reduce the anxiety associated with uncertainty and also to reduce the perceived degree of uncertainty. After describing uncertainty about her future, P3 identified employing positive self-talk in response to this.

Interviewer: "And how do you cope with that uncertainty about your future?"

P3: "Well... I do tell myself sometimes that, like, you know, if you really want something then you can do it. You know, and there's more than one way to get to university, more than one way to get to different jobs..."

Positive self-talk may increase the perceived certainty of a positive outcome, again through a form of reassurance. Participants also described attempts to focus their attention on recovery, rather than uncertainty, such as by recognising and challenging biased thinking, challenging and discontinuing eating disorder behaviour, and channelling effort into the recovery process.

Distraction was also employed by a number of participants. This was defined as a positive coping strategy - distinct from avoidance in that there was no requirement or benefit to attending to the situation. Rather, distraction assisted in reducing the anxiety associated with uncertainty. Distraction behaviour included engaging in alternative activities, such as reading or doing a puzzle book.

A final helpful strategy identified by participants involved accepting the uncertainty. Unlike other strategies, this did not involve an explicit attempt to reduce or avoid the uncertainty. Acceptance of uncertainty was described by two participants. P2, with a lengthy history of treatment, described acceptance as developing very recently in treatment as part of her renewed attempt to challenge the eating disorder. P5, with the shortest course of illness, described recently reflecting on the benefits of acceptance.

Interviewer: "Are there times when you would prefer to be uncertain or ways in which uncertainty can be a good thing - in your life right now with the eating disorder?

P5: "Um… yeah well I've been reading this book, 'The Happiness Trap', yeah, and, um, yeah it's sort of trying to say about how, like, you know, you just

should accept your emotions and, um, not try and be too in control … um, so yeah I guess probably a bit of uncertainty is good, I guess, um, can be beneficial, but too much can also, sort of, be a bit of a downer, be disappointing, yeah."

This was the sole reference to the possible benefits of uncertainty. Instances of accepting or effectively managing particular types of uncertainty did not readily come to mind for the other participants.

2.3.4 Uncertainty metacognitions. Four themes were identified within this category reflecting metacognitions regarding uncertainty, including beliefs and attitudes towards uncertainty.

2.3.4.1 Uncertainty as distinctly negative. Uncertainty was described in distinctly negative terms by all participants. P4 provides a rich account of her markedly negative view of uncertainty.

Interviewer: "Can you tell me any more about what uncertainty is like for you - in your life right now with the eating disorder?"

P4: "It's horrible... It's like every minute of the day it's just so encapsulating... It's just... really depressing and... you just can't escape it..."

Participants also described uncertainty itself as very difficult to tolerate, as clearly described by P1.

P1: "…It was just the... the not knowing that drove... drove me, well, mad."

Insight can also be garnered by what participants *did not* say. Three of the five participants did not identify any positive component to uncertainty. It was only P2, later in treatment, and P5 with the shortest course of the eating disorder who could clearly identify a positive component to uncertainty itself (see section 2.3.4.3). None of

the five participants mentioned surprise, novelty, or spontaneity as potentially positive facets of uncertainty.

2.3.4.2 Uncertainty as inevitable. Participants also commented on the unescapable or inevitable nature of uncertainty. Most participants strived to reduce uncertainty in their life, but the inability to escape all uncertainty was sporadically acknowledged.

2.3.4.3 Acknowledging a positive component to uncertainty. P2 and P5 were the only participants to acknowledge a positive component to uncertainty itself. P2 described this as apparent during the later stages of treatment, when contemplating the caloric content of food. She reported less anxiety and the ability to eat more easily when she was uncertain of the exact calorie content of the food.

> Interviewer: "Are there times when you would prefer to be uncertain or ways in which uncertainty can be a good thing - in your life right now with the eating disorder?"
>
> P2: "Well yeah, sometimes, like, a perfect example was ... we went to a café and… everything on the menu had the kilojoules written under it… If I look at what the kilojoules… I'm gonna choose the thing with the least kilojoules and it'll probably taste like cardboard and… then it puts that whole numbers game in my head."
>
> [After going to a cafe without kilojoules information...]
>
> P2: "In a sense that's when being uncertain actually helped because I was like, well, I don't know how many calories are in this scone, it's just a scone [laughs]… so that helped my head… and same with being served the meals here ... you just learn to deal with 'ok this is a rice and something dish'… whereas

when I knew before it was like I knew the exact weight, calories, sugar, carb content, everything… sometimes it would mess with my head knowing that..."

P5 also identified a potential benefit to uncertainty, reflecting that uncertainty may propel someone to discover or learn.

Interviewer: "Were there other times then when you would prefer to be uncertain or ways in which uncertainty could be a good thing, before you developed an eating disorder?"

P5: "Mm… yeah, um… I think uncertainty can be good, like, it sort of pushes you a bit, um… yeah… I don't know [laugh]."

Interviewer: "And how does it push you?"

P5: "Yeah, uh… I dunno, just like, by being uncertain you're sort of pushed to, like, do that little bit more research and try and… yeah."

Furthermore, as described earlier, P5, with the shortest course of illness, was the only participant to identify a positive emotion occurring in direct response to an uncertain situation, namely excitement about embarking on an overseas exchange program prior to commencing university. P5 also reported a more positive method of responding to uncertainty.

Interviewer: "What did you do to cope with the uncertainty…?"

P5: "Yeah, um… I dunno I guess I just sort of had to be patient and wait and just hope [laugh] for the best that it was gonna turn out alright."

Not all participants recognised a benefit to uncertainty, but most recognised a benefit to experiencing uncertainty in order to learn to cope with it. That is, the

presence of uncertainty was described as helpful, but only insofar as to increases one's ability to manage it, as clearly reflected in a response from P3.

> Interviewer: "Are there times when you would prefer to be uncertain or ways in which uncertainty can be a good thing - in your life right now with the eating disorder?"
>
> P3: "Um... well I guess it can be a good thing but there's always gonna be uncertainty, I don't know how there couldn't be. So, you know, I guess it's good to have it around so you learn eventually how to deal with it... 'cause the world is always changing."

2.3.4.4 Limited awareness of intolerance of uncertainty. P1 reported some awareness of her intolerance of uncertainty, describing uncertainty as an "issue that needs to be addressed in eating disorders". Most participants, however, had not previously contemplated their experience with or tolerance for uncertainty, however some participants reported being able to connect their appraisal of uncertainty with previously identified anxieties. Following the interview, P2 described contemplating the possible role of uncertainty (or an intolerance of uncertainty) in her life and deliberating when uncertainty may be beneficial.

> P2: "Mm, no, I guess it's something I haven't really thought of, much of, so it's actually been quite good exploring it ... I think I'm gonna go back and be thinking all night, 'oh... maybe that led to my relapse then...' or 'maybe... maybe this had an impact on my eating disorder'... I've never really thought about it that much but... I think it's helpful to think about... It's actually got me thinking a lot towards my, like, approaching my recovery now, like kind of, just the times

where it is better to be uncertain and I'm kind of rethinking different things that is best to be uncertain about [laugh], if that makes sense."

2.3.5 Variation across stages of the disorder. Within this category, three themes were identified which describe the consistency and variation in the experience of uncertainty across time, course of illness, and stage of treatment. The first and second themes in combination suggest a bidirectional relationship between the experience of uncertainty and the eating disorder.

2.3.5.1 Intensification of the experience of uncertainty due to the eating disorder. Participants reported experiencing less uncertainty and being less affected by uncertainty prior to the eating disorder. Participants also reported directing less attention towards any uncertainty that was present prior to the eating disorder. P5, with a short course of illness, tended to describe more normative uncertainty occurring prior to the eating disorder, such as uncertainty inherent in a new situation (i.e., travelling overseas to work with people she had not met). P2 also described somewhat normative uncertainty occurring prior to the eating disorder in regard to her day-to-day activities, due to living in a chaotic household with a lack of routine.

Correspondingly, the development of the eating disorder was linked with an increase in both the degree of uncertainty and the intensity of the response to uncertainty. Particularly prominent forms of uncertainty induced by the eating disorder, and identified by participants, included uncertainty about the self and uncertainty associated with treatment, as detailed in earlier themes. P2 recalled a cascade of uncertainty induced by progression of the eating disorder.

P2: "…Yeah, pretty much there's been a lot of uncertainty because I became too sick to kind of live independently by myself and then [after travelling overseas] I didn't know where I was going to be living when I came back so there was a lot

> of uncertainty around um you know um 'do I move back to Sydney and live independently' or… then it was questioned whether I was well enough to and anyway so I didn't know if I'll be going back to uni - I still don't know actually, and um yeah so pretty much I was uncertain where I was gonna live and what would be best for my recovery, um, so that made me quite anxious thinking about it ... You know, like, do I need another hospital admission, am I… am I sick enough like have I gone to the extent that where I need that or will I get too frustrated living with my mum and dad..."

P4 described uncertainty prior to the eating disorder as similar, but less persistent.

> Interviewer: Can you tell me any more about what uncertainty was like for you then, before you developed an eating disorder...?
>
> P4: Similar but not as, like, consuming. Now it's, like, constant, whereas before it was a bit more intermittent.

Participants varied in their response to uncertainty prior to the eating disorder. Some described a negative reaction, whereas others reported a more tolerant or normative response to uncertainty at this time. P3 described an intolerance of uncertainty prior to the eating disorder, citing self-harm as a method she used for coping with uncertainty at that time. Conversely, P1 reported being unlikely to have noticed or been concerned by uncertainty prior to the eating disorder. P2 also described less distress with uncertainty prior to the eating disorder. However, regardless of a high or low tolerance of uncertainty prior to the eating disorder, all participants referenced some degree of negative change in their response to uncertainty with the development of an eating disorder. This typically involved heightened distress in response to uncertainty. For P3, while she employed maladaptive coping behaviour prior to the eating disorder

in the form of self-harm, behaviours more specific to the eating disorder (such as dietary restriction) became the prominent coping mechanisms after onset of the eating disorder.

2.3.5.2 Intensification of the eating disorder due to the experience of uncertainty. Uncertainty was explicitly identified as a possible contributor to the progression of the eating disorder by several participants. P4 described uncertainty about the right choice as contributing to development of the eating disorder.

> P4: "I think, like, the uncertainty is part of the reason why I got an eating disorder because, um, my mum passed away last year about this time in the year and she was always, like, the meal provider, like, she always set my meals for me and then when she passed away I no longer had someone giving me the meals and it became my choice and I was so uncertain as to what I was meant to have and what sort of things I was meant to have and it just got so overwhelming that I was like I just won't make the decision, so I think it's really big for me. I think it's, like, a huge part of it, yeah... Yeah, like it wasn't so much about the way I looked – it was more about not knowing what was right, sort of thing."

P3 appeared to attribute part of the responsibility for requiring treatment to her management of uncertainty.

> Interviewer: "Do you think you respond to uncertainty in the same way as other people - in your life right now with the eating disorder?"
>
> P3: "No... Not at all [laugh]."
>
> Interviewer: "What makes it different?"

> P3: "Well clearly it's landed me in hospital a lot of times [laugh] and... most other people don't get as caught up in all the emotional stuff as I do... when they're faced with scary things but... yeah."

Uncertainty may serve to maintain the eating disorder via the coping behaviours prompted by an intolerance of uncertainty. That is, the method of responding to uncertainty, in the form of eating disorder behaviours, may serve to strengthen the eating disorder. P1 described uncertainty – even in instances unrelated to eating and weight – as affecting her eating behaviour.

> P1: "I know that uni and not knowing what's going to happen definitely affects my... my eating in a big way..."

Furthermore, other behaviours employed to cope with uncertainty may have an indirect role in strengthening the eating disorder. For example, distraction was identified as a method of coping and, while generally regarded as helpful, P2 identified one form of distraction as exercise, which may contribute to the emergence of eating disorder behaviour.

2.3.5.3 Variation in the experience of uncertainty across disorders and treatment stage. P1's history of both anorexia nervosa and bulimia nervosa allowed her to contrast the differences in her experience of uncertainty with each disorder. She described a higher concern about day-to-day, intricate uncertainties with anorexia nervosa, compared with greater concern regarding "bigger-picture" or future-oriented uncertainty and more pronounced catastrophic thinking with bulimia nervosa.

> P1: "Uh... Well when I was like... full-on bulimic I used to worry about the bigger stuff more, but when I was at a lower weight I would worry about the little nit-picky type things of the day. Um... it was, when I was bulimic, it was

> 'you're never going to lose any weight, you're never gonna get into uni... you're never gonna do this, you're never gonna do that.' Um... but when I was anorexic I was like, 'well you are doing it and you're gonna make sure that it is this, and that, and the other – and absolutely nothing can be otherwise'."

P1 also identified interpersonal uncertainty as particularly prominent when underweight with anorexia nervosa.

> Interviewer: "Are there any other comments you would like to make about what we have discussed?
>
> P1: "Um... only that it was heightened when I was underweight and like I said before it was about the intricacies of... and it was a more, um, a more social paranoia that I had, about not knowing for sure whether someone liked me and things like that. Um, but, bulimia for me anyway tended to be about, like, this catastrophic thing, um, where one thing could just be the end of it all type thing... Um... they're two completely different feelings, yeah."

In addition to variation across types of illness, illness duration also appeared to influence the experience of uncertainty. The participant with the shortest course of illness (P5) reported the least uncertainty and being the least affected by uncertainty. Further to this, P5 demonstrated more balanced speculation both with and prior to the eating disorder. All participants expressed uncertainty about whether they would recover from the eating disorder, and this was apparent regardless of their type of illness or stage of treatment. However, for P5 with the shortest course of illness, the speculation prompted by such uncertainty was relatively more balanced across positive and negative possibilities.

> Interviewer: "Can you tell me any more about what uncertainty is like for you – in your life right now with the eating disorder?"
>
> P5: "Yeah, no I think it's difficult, um, definitely… and the uncertainty about just not knowing when I'm gonna get better and, like, if I'm gonna get better… Like, I see people here who are 30 and they've come back for their tenth admission or something and I just sort of, I'm like, 'is that going to be me?' or 'am I gonna be the girl that recovers?', like, I don't know. Um, and sometimes I feel like 'yeah, I'm gonna be the girl that recovers' and then sometimes I feel like 'no, I, I don't know if I can beat this'… Um, and yeah I guess it's sort of, yeah, it's quite difficult to come to terms with that..."

P2, with a 10-year history of illness, also described her uncertainty about recovery.

> P2: "...It's kind of now, like, a bit uncertain just around recovering again. You know, like, I'm uncertain and you know, like, I want to be certain I will recover but I've had so many admissions over the past two years, it's like that whole 'when is it going to happen?' ... I keep on thinking, 'am I going to be like this forever? Can I change these thoughts?' Um, so yeah, I guess... at the moment I'm very uncertain and, you know, fear what my life is going to turn out like, being 26 and still having an eating disorder..."

In later stages of treatment, participants tended to describe more adaptive methods of coping with uncertainty. P2 identified a shift from employing eating disorder behaviour as a coping mechanism to the use of more normative coping strategies (such as social support) as treatment progressed. Another participant (P3) described actively attempting to reduce her use of maladaptive coping strategies later in treatment.

Interviewer: "Can you tell me any more about what uncertainty is like for you - in your life right now with the eating disorder?"

P3: "Um... well I don't know... right now, um, the uncertainty is all about what is gonna happen to my future 'cause I've already wasted so much time in hospital and... it's just like, 'cause now I've seen a lot of people who've spent their entire lives in an eating disorder and not done anything and it scares me and I'm worried that's how I'm gonna turn out like too. Yeah... so I'm... I'm really trying this time to... well, I don't know... cope with things not using my eating disorder or some other self-destructive behaviour."

The type of coping strategies employed may change across treatment stage, however whether the experience of uncertainty changes is yet to be determined. Despite more adaptive coping, P2 perceived her emotional response to uncertainty as continuing to entail more anxiety than that expected in others. She did, however, describe a difference in the type of uncertainty she experienced during her period of recovery, which was appraised as more normative.

P2: "[The uncertainty experienced during recovery was] ...more I guess probably to do with uni and maybe my relationship at the time… uncertainty whether he would be faithful ... There were a couple of times when he kind of... cheated or... almost did... so yeah, there was a lot of uncertainty of where the relationship was going. Um, I guess it was uncertainty around more normal things in life, like, um, uni as well, like, uncertain if I'd put in enough, if I was going to pass, um, and... in my first year it was very uncertain because I... you know, I hadn't finished my HSC..."

The propensity to identify a positive component to uncertainty may also vary across treatment stage. As described in an earlier theme, P2 acknowledged a benefit to being uncertain, however this recognition only begun to develop during the later stages of her treatment. The only other participant to identify a positive component to uncertainty was P5, with a very brief treatment history.

2.4 Discussion

The current study sought to investigate the lived experience of uncertainty for women with an eating disorder undergoing treatment in an inpatient unit. This research partially replicates and extends previous research by Sternheim and colleagues (2011), which investigated the meaning of uncertainty for women with anorexia nervosa. The current study extended this by interviewing women with varying eating disorder presentations and examining the relationship between the experience of uncertainty and stage of illness, including reflection on the experience of uncertainty prior to onset of the eating disorder. Interpretative phenomenological analysis was employed, resulting in five super-ordinate categories of themes. These categories described the types of uncertainty experienced by participants, responses to uncertainty, methods of coping, beliefs about uncertainty, and variation in the experience of uncertainty across the course of illness.

2.4.1 Features of the sample. The current study obtained the accounts of five individuals undergoing inpatient treatment for a diagnosed eating disorder. In the study by Sternheim and colleagues (2011), data was obtained through three focus groups, each lasting 30-45 minutes. Each focus group consisted of three individuals, resulting in a total sample size of nine participants. Alternatively, the current study chose to employ one-to-one interviews with the expectation of achieving a more in-depth account from each participant. This produced a smaller sample size overall, however information was gathered from five interviews, each lasting approximately 30-40

minutes, thus resulting in a comparable, if not greater, amount of data. At this early stage of research into uncertainty and eating disorders, a thorough investigation into the experiences of a smaller number of individuals was deemed more useful than obtaining potentially tenuous generalisations through less in-depth research with a larger number of individuals. As outlined by Smith and Osborn (2008), interpretative phenomenological analysis is designed to encourage highly detailed examination of individual cases, which, as further research is conducted, will allow the gradual development of more generalisable claims created on a solid foundation of investigation.

Participants varied in terms of type of illness, severity, and course of the disorder. The inclusion of such variation was an intentional aspect of the study design. While many research studies strive to achieve a strongly homogenous sample, the reality is that even within a specific type of disorder there is often wide variation in experiences between individuals. This does not imply that generalisations cannot be made. Indeed, certain features often present as common across individuals, but such features should be identifiable without radically restricting a sample to result in a poor reflection of the natural group, such as through the exclusion of individuals with a comorbid condition. Restriction of this kind would not represent the vast majority of individuals with eating disorders. As such, it was considered more helpful to include a sample of individuals with the necessary criteria (i.e., an eating disorder diagnosis), while allowing for other, naturally occurring variation, which was thus not considered "noise", but rather facets that add depth to a broader understanding of uncertainty in the context of eating disorders.

2.4.2 The experience of uncertainty in the eating disorder context. The first research question sought to assess the forms of uncertainty identified by women with a diagnosed eating disorder and their experience of such uncertainty. A number of

common sources of uncertainty were identified, including (a) uncertainty about the self, particularly one's own preferences, decisions, capabilities and behaviour, (b) uncertainty about the treatment process, (c) uncertainty about interpersonal relationships, and (d) uncertainty about the future, including specific events, general unknown future circumstances and the consequences of a change in the self or environment. Participants typically perceived uncertainty as intense and pervasive in their lives, presenting across both eating disorder and non-eating disorder related contexts.

Responses to uncertainty were assessed in terms of emotions, cognitions, and physical reactions. Emotional responses to uncertainty were often intense but appeared most pronounced following onset of the eating disorder. Anxiety was the primary overarching emotion reported by participants, although hopelessness, anger, and other typically negative emotions were also described. Excitement was the only positive emotional response identified, and only reported by the participant with the shortest course of illness. Cognitive responses to uncertainty included biased thinking, particularly speculation and catastrophic thinking, along with rumination and indecision. Physical reactions, such as agitation, were identified by some participants but were generally eclipsed by the corresponding emotional or cognitive responses.

Uncertainty was described by participants in distinctly negative terms, with no spontaneous acknowledgement of a positive component to uncertainty, such as the possibility of novelty, spontaneity, or surprise. Interestingly, while this appears consistent with low novelty-seeking reported in patients with anorexia nervosa, it is less intuitively consistent with reports of high novelty-seeking in patients with bulimia nervosa (Cassin & von Ranson, 2005; Fassino et al., 2002). The construct of novelty-seeking is, however, distinct from intolerance of uncertainty and variation in these constructs may explain these differences. For instance, increased novelty-seeking in

bulimia nervosa has been attributed to elevations in attributes such as impulsivity (e.g., Fassino et al., 2002), which may reflect specific deficits, such as emotion dysregulation (Hinshaw, 2003). This conceptualisation of specific deficits as related to novelty-seeking is clearly distinct from the characteristic appraisal of the acceptability of uncertainty that defines an intolerance of uncertainty.

The current findings suggest a number of similarities and differences between the experience of uncertainty for women with eating disorders and the experiences of other populations who possess a high intolerance of uncertainty which should be investigated in future research directly comparing different populations. Among the similarities suggested by the present findings is the pervasive nature of intolerance of uncertainty. Research utilising a university sample found individuals with a high intolerance of uncertainty to appraise all types of uncertain situations as more disconcerting relative to individuals with a lower intolerance of uncertainty (Koerner & Dugas, 2008). This is consistent with the pervasive experience of uncertainty reported by participants in the current study. Specific types of uncertainty described by participants in the current sample have also been reported as distressing for other clinical populations exhibiting a high intolerance of uncertainty, such as interpersonal uncertainty in social anxiety (Carleton, Collimore, & Asmundson, 2010). Specific responses to uncertainty identified in both community samples and the current eating disorder sample include uncertainty paralysis, biased thinking, information seeking, difficulty with decision making, and a bias towards threatening interpretations of uncertain situations (Carleton, Norton, & Asmundson, 2007; Dugas et al., 1997; Dugas et al., 1998; Mogg et al., 1994). Similar responses to uncertainty have also been observed between the current sample and other clinical populations, such as rituals and checking behaviours, reported by individuals with obsessive-compulsive disorder who possess a high intolerance of uncertainty (Holaway et al., 2006; Tolin et al., 2003).

Features that appear to be specific to individuals with eating disorders include forms of uncertainty specifically associated with eating and weight and the use of eating disorder behaviours to cope with uncertainty. In addition, the amplification of uncertainty due to a fear of making mistakes or perfectionism may also be more prominent for individuals with eating disorders. In the current study, most participants perceived their experience and response to uncertainty as being different from others. Indeed, the pervasiveness and intensity of the experience of uncertainty for participants in the current study appeared heightened by a range of factors, including (a) a fear of making mistakes, (b) perfectionism and fear of failure, (c) biased attention towards indicators of uncertainty and hypervigilance to threat, and (d) a low sense of agency.

A fear of making mistakes appeared to intensify the experience of uncertainty regarding one's own decisions and behaviour. While eating disorders are often linked with a desire for control, the ability to make one's own choice was perceived as threatening by some participants. Permission to be the decision-maker ignited intense uncertainty about making the right choice, resulting in a high level of distress. The underlying processes contributing to this distress are not yet clear, but participant accounts suggest a fear of responsibility, fear of a catastrophic outcome, and perceived inability to cope with or manage a wrong decision or action. In sum, a fear of making mistakes may exacerbate an intolerance of uncertainty, since uncertainty about one's choices is likely to be particularly distressing when the prospect of making a wrong choice is highly feared. This is particularly relevant in the eating disorder context, as previous research has shown the two subscales of the Frost Multidimensional Perfectionism Scale to maintain the strongest relationship with eating disorder symptoms to be the Concern Over Mistakes and Doubting of Actions subscales (Bulik et al., 2003; Minarik & Ahrens, 1996).

Perfectionism and a fear of failure may also intensify the uncertainty experience in certain circumstances. It is useful to clarify the distinction between intolerance of uncertainty, perfectionism, and the fear of failure. Confusion can occur in considering a scenario such as distress due to waiting for an exam result. The distress in this circumstance could be attributed to uncertainty about the outcome or a fear of failure, intensified by perfectionism. Distress associated with uncertainty is typically identifiable by a strong desire to learn the outcome. Conversely, a fear of failure focuses more strongly on the nature of the outcome itself, and could actually include avoidance of learning the outcome. Finally, perfectionism typically increases the range of outcomes perceived to be negative. Perfectionism and a fear of failure may thus bias attention towards uncertainties involving the possibility of failure, and heighten the importance placed on such uncertainties. This is particularly worthy of consideration in the eating disorder context, since elevated levels of perfectionism have been observed across individuals with both anorexia nervosa and bulimia nervosa (e.g., Bulik et al., 2003; Halmi et al., 2000).

The participants' responses indicated that attention appeared biased towards any indicator of uncertainty or a negative, often unlikely, possibility. This bias is consistent with a heightened awareness or propensity to search for threat, a common feature of anxiety. For many participants, an uncertain or possible negative outcome quickly transformed to the perception of a certain or definite negative outcome, which may result from an unwillingness to tolerate uncertainty for an extended period without a resolution. In such instances, a certain negative may be perceived as less distressing than remaining uncertain. A potential hypothesis for understanding such a preference refers to one's ability to acclimatise. When experiencing uncertainty due to a potentially negative but unconfirmed circumstance, it may be difficult for an individual to move forward or adjust to this situation. The uncertainty may constrain the

individual to a state of limbo, inhibiting the ability to begin the process of adjustment or adaptation. Conversely, a resolution, even if negative in nature, allows the individual to begin moving on with their lives. Further research is required to assess the validity of such a hypothesis.

The commentary of participants throughout the interviews suggested that participants experienced a low sense of agency. Interestingly, the only participant to express a stronger sense of agency was the participant with the shortest course of illness. A low sense of agency is likely to intensify the experience of uncertainty due to the perceived lack of influence over the uncertain circumstance, which may correspondingly exacerbate an intolerance of uncertainty. Koerner and Dugas (2008) suggest that the perception of an uncertain circumstance as beyond one's control or the perception of oneself as incapable of effectively responding to uncertainty may bolster an intolerance of uncertainty. A low sense of agency may be considered along a similar line of reasoning, which is again highly relevant in the eating disorder context, as previous research has shown a typically reduced sense of agency for individuals with anorexia nervosa and bulimia nervosa, speculated to be central to core eating disorder pathology (Dalgleish et al., 2001).

2.4.3 Uncertainty in the inpatient environment. The second research question sought to determine the nature and experience of uncertainty associated with eating disorder treatment in the unique environment of an inpatient unit. A number of components throughout treatment exposed the patients to a significant degree of uncertainty, such as the provision of meals without information regarding their composition or calorie content, weighing without permission to know the weight, and an uncertain discharge date. Participants were also often uncertain of treatment itself – the nature of treatment, eventual efficacy, and most appropriate treatment for recovery. Such uncertainty about treatment contributed to difficulty in trusting the treatment itself

and the treatment providers. For one participant, the uncertainty led to anger with the treatment providers. It is possible that anger may result from the demand for certainty in situations in which certainty is unfeasible. For example, it cannot be known with certainty what will be the most suitable medication for a patient. Anger and a lack of trust in treatment is likely to have implications for treatment compliance or disengagement.

All participants also described uncertainty about their ability to cope if or when they eventually recovered. For the participant with the shortest course of illness, speculation about whether or not she would recover was more balanced across possibilities, yet it was apparent that this uncertainty was already difficult to tolerate in her early stage of treatment. It is possible that bearing this uncertainty may become increasingly difficult with prolonged treatment, resulting in surrender to the conclusion of hopelessness and remaining entrenched in the eating disorder. Increasing a patient's self-efficacy and shifting attention towards recovery may be useful in both minimising the perceived uncertainty and alleviating the anxiety associated with this uncertainty.

Uncertainty about the world outside of treatment was also contemplated by participants during their inpatient stay and prompted one of two alternate responses, namely (a) an avoidant response, encouraging the individual to remain entrenched in the eating disorder due to fear of returning to an uncertain world upon recovery, or (b) persistence with inpatient treatment and hopefully recovery so as not to need to return to a life dominated by uncertainty. The rationale for each response is clear, yet the likelihood or ability to influence a patient engaging in one response or the other remains unknown.

2.4.4 Coping with uncertainty from an eating disorder mindset. The third research question examined the methods of coping with uncertainty employed by women with an eating disorder. Eating disorder behaviours were the most commonly

reported response described by participants, identified as both an impulsive reaction to uncertainty and an intentional strategy for coping with uncertainty. Specific behaviours included dietary restriction, excessive exercise, purging, laxative misuse, and binge eating.

Eating disorder behaviours were typically employed with the aim of either (a) reducing the uncertainty, or (b) soothing the corresponding anxiety. Instances of uncertainty commonly triggered catastrophic thinking, which led to the use of compensatory behaviours in an effort to reduce the uncertainty and corresponding distressing cognitions. For example, uncertainty about the effect of eating typically led to a catastrophic prediction of substantial weight gain. In response to this belief, extreme compensatory behaviour, such as repeated purging, was employed in an effort to reduce the uncertainty about the effect of eating or, more specifically, to increase certainty that the food would be purged and there would be no subsequent effect on weight. Binge eating, conversely, was more typically employed to reduce the anxiety invoked by uncertainty, which is consistent with a large body of research identifying the use of binge eating as a mechanism for alleviating negative mood states (e.g., Alpersa & Tuschen-Caffier, 2001; Whiteside et al., 2007).

Engagement with the eating disorder to assist in coping with uncertainty, while considered maladaptive, may be perceived as positive and helpful by patients - at least in the short-term. Sternheim and colleagues (2011) refer to the commonly held beliefs of patients with anorexia nervosa regarding the positive function of their disorder, suggesting that an intolerance of uncertainty may reinforce the perceived positive function. Based on the current findings, this may be further extended to suggest that eating disorder symptoms across both anorexia nervosa and bulimia nervosa may be perceived as helpful by patients in regard to reducing uncertainty and the associated anxiety.

Information seeking, checking behaviour, and overcompensating were also employed to reduce actual or perceived uncertainty and were often achieved through behaviours commonly recognised in eating disorder populations, such as meticulous measurement of food and mirror checking. This highlights a possible link between uncertainty and another core feature of eating disorders, namely rigid, ritualised behaviours. Rituals and rigidity may both serve to increase actual or perceived certainty, which is consistent with previous research suggesting that ritualistic behaviour may be undertaken in part to address a need for certainty (Beech & Liddel, 1974, cited in Steketee, Frost, & Cohen, 1998). Rituals may thus create an illusion of certainty, while rigidity - ensuring sameness and disallowing change - may allow the individual to avoid uncertainty altogether.

A strong desire to avoid uncertainty and associated anxiety was commonly reported by participants and corresponds with the well-documented research linking eating disorders with more general distress intolerance, that is, difficulty tolerating negative mood states, along with deficits in emotion regulation (Anestis et al., 2007; Corstorphine, 2006; Corstophine et al., 2007; Fairburn et al., 2003; Harrison et al., 2009). Corstophine and colleagues (2007) found women with eating disorders to be more likely than controls to engage in emotional avoidance, and eating disorder behaviours have been identified as one method of mood regulation or minimising short-term awareness of emotions that cannot be tolerated (Anestis et al., 2007; Corstorphine, 2006; Fairburn et al., 2003).

In response to this distress intolerance, a number of avoidant mechanisms for coping, in addition to eating disorder behaviours, were described by participants, including denial, procrastination, medication, binge drinking, and social withdrawal. Such behaviours were typically perceived as less distressing for participants than confronting the uncertainty, but often resulted in some form of paralysis. Unless an

outcome was perceived as certain, a task may not be pursued at all. Furthermore, setting goals or plans posed a challenge for participants who were intolerant of uncertainty. A goal or plan was perceived as distressing given the uncertainty in being future-focused and typically not guaranteed. However, the lack of a plan was also perceived as stressful since it too inevitably generates uncertainty. This resulted in a conflict for participants, which was not easily resolved.

Despite maladaptive coping strategies being most frequently identified, a number of adaptive coping methods were also reported by participants, including support-seeking, positive self-talk, distraction, focusing attention on recovery, and acceptance of uncertainty. Aside from acceptance of uncertainty, these strategies typically served to either reduce the perceived degree of uncertainty or shift attention away from uncertainty. The perception of uncertainty was reduced through the provision of reassurance and positive reinforcement gained from social support and positive self-talk.

2.4.5 Uncertainty across stage and type of illness. The final research question sought to examine variation in the experience of uncertainty across stage and type of illness. Participants typically reported an increase in the frequency, intensity, and influence of uncertainty following onset of the eating disorder, attributed to an actual increase in the prevalence of uncertainty, additional attention focused on uncertainty, and a change in the strategies employed to cope with uncertainty. Participants recalled reasonably normative forms of uncertainty occurring prior to the eating disorder, such as uncertainty regarding a novel situation. Furthermore, uncertainty was typically recalled as being easily dismissed or not considered. Following onset of the eating disorder, more intricate and eating-related uncertainties were described, such as uncertainty regarding the precise composition of food. Increased allocation of attentional resources towards uncertainty was also apparent, potentially resulting from

the increased and seemingly pervasive nature of uncertainty associated with the eating disorder.

The type of coping strategies employed in response to uncertainty appeared to vary across the course of illness and treatment stage. Onset of the eating disorder was associated with the use of characteristic, maladaptive coping strategies, as described in an earlier section. One participant described the use of different coping strategies during a period of recovery, yet these remained maladaptive (e.g., binge drinking). It is possible that, even after treatment, some individuals may not have developed adaptive coping techniques for managing uncertainty. However, adaptive methods of coping were identified by some participants in the later stages of treatment. While methods for coping may change, whether there is a change in the actual experience of uncertainty - such as the emotional reaction to uncertainty - is yet to be determined.

Recognition of a positive component to uncertainty may also vary with length of illness and stage of treatment. Only two participants in the current study were able to identify a positive component to uncertainty – the participant with the shortest course of illness and the participant with the longest history of treatment. Further investigation is needed to determine a possible link between length of illness or treatment and the ability to recognise positive aspects of uncertainty.

In regards to type of illness, one participant who had experienced both anorexia nervosa and bulimia nervosa described differences in her experience of uncertainty across each disorder. Day-to-day, intricate uncertainties were described as most distressing with anorexia nervosa, while bigger-picture, future-focused uncertainties were more prevalent with bulimia nervosa. The intricate uncertainty described in anorexia nervosa is consistent with previous research into central coherence, which suggests a tendency for individuals with anorexia nervosa to employ a detail-based, piecemeal information-processing style (Lopez et al., 2008; Southgate, Tchanturia, &

Treasure, 2008; Tchanturia & Hambrook, 2010). Beyond this distinction however, consistent variation was not apparent in the experience of uncertainty due to type of illness. Stage of treatment appeared more influential in terms of the impact on the perception and experience of uncertainty. This finding is consistent with previous research by Sternheim and colleagues (2011), which did not identify any differences in the experience of uncertainty across the restricting and binge-purging subtypes of anorexia nervosa. It is possible that, even if minor variation exists, such variation is not significant in terms of an overall conceptualisation of the perception and response to uncertainty by women with an eating disorder diagnosis.

2.4.6 Comparison and extension of previous research. The themes identified in the current study support and extend the findings of Sternheim and colleagues (2011). Broad similarities are evident across studies, including patients' descriptions of uncertainty as distinctly negative and persisting across contexts, along with perceiving their own experience of uncertainty as different to others. Similar forms of uncertainty emerged across studies, including eating- and weight-related uncertainty, interpersonal uncertainty, and future-oriented uncertainty. Specific types of uncertainty observed across studies included uncertainty about the self (referred to by Sternheim and colleagues as "inner resources"), uncertainty regarding others, and uncertainty regarding recovery. Additional consistency was observed across studies in regard to (a) acknowledgement of the inevitable nature of uncertainty, (b) identification of the eating disorder as contributing to an increased sense of uncertainty, and (c) minimal acknowledgement of a positive component to uncertainty.

In contrast, patients in the study by Sternheim and colleagues (2011) described an additional component of uncertainty regarding one's identity following recovery, which is likely due to the larger sample of patients with anorexia nervosa. The perception of an eating disorder as part of one's identity is more commonly recognised

as occurring in anorexia nervosa, rather than other types of eating disorders (Tan, Hope, & Stewart, 2003a, 2003b; Tan, Hope, Stewart, & Fitzpatrick, 2006). It would be useful for future research to consider the implications of such uncertainty, in conjunction with the recovery-related uncertainty identified in the current study.

In line with the research by Sternheim and colleagues (2011), patients in the current study did not differentiate between uncertainty and ambiguity, yet both constructs were described. While there is a theoretical difference between the constructs of intolerance of uncertainty and intolerance of ambiguity (see section 1.4), it is considered more useful from a treatment perspective to consider both constructs under the umbrella term of "intolerance of uncertainty".

Similarities and differences were observed across studies in regard to patients' reactions to uncertainty. A range of distressing cognitive, emotional, and physical responses were described by patients across studies, however the relative weighting of each category differed. Sternheim and colleagues (2011) reported patients to describe their experience of uncertainty in predominantly physical terms, such as feeling suffocated. Conversely, emotional and cognitive reactions appeared most salient for patients in the current study. Whether this distinction may be attributed to characteristics of the research or to the patients themselves is not clear, however the differences suggest continued consideration of each of the three components in future research.

In both studies, participants were queried regarding their methods of coping with uncertainty. While eating disorder behaviour was identified as a coping method by Sternheim and colleagues (2011), the current study further explored the mechanism through which this behaviour assists patients. Sternheim and colleagues described eating disorder behaviour as a general method of coping by patients, providing a sense of safety. The current study identified a more specific function of eating disorder

behaviour in many instances, which entailed a reduction in the perception of uncertainty. Other coping methods were also observed across both studies, including avoidance, social withdrawal, distraction, medication, and alcohol use. A drive for structure and organisation identified by Sternheim and colleagues parallels the rigidity described in the current study. In terms of positive coping strategies, engaging social support was described by Sternheim and colleagues as contributing strength and calmness to patients when facing uncertainty. An increased understanding of this mechanism was also gained in the current research, which identified social support as additionally serving to reduce the perception of uncertainty through reinforcement and reassurance.

Finally, the findings of Sternheim and colleagues (2011) were further extended by including an assessment of patients' reported experiences with uncertainty prior to and since onset of the eating disorder. This has allowed insight into variation in the experience of uncertainty across different stages of illness and treatment. Findings indicate a possible role of intolerance of uncertainty as both a contributor to development of the eating disorder, as well as a maintaining factor for eating disorder symptoms. Future research employing a longitudinal methodology will be useful in clarifying this time course.

2.4.7 Implications for conceptualisation and treatment. The current findings extend previous research into uncertainty and eating disorders by deepening our understanding of the specific perceptions, responses, and coping strategies employed by women with an eating disorder when faced with uncertainty. The findings also provide preliminary support for a role of intolerance of uncertainty in the eating disorder maintenance models described earlier (see section 1.10). Specifically, the distinctly negative appraisal of uncertainty and the negative emotions described by patients in response to uncertainty support the proposed role of intolerance of uncertainty as a

contributor to negative affect in the dual-pathway model of bulimia nervosa (Stice, 2001; Stice & Agras, 1998). In this model, negative affect is proposed to increase eating disorder symptoms. This successive pathway is supported by the findings of the current study identifying patients' frequent engagement in eating disorder behaviours as a method for coping with the uncertainty and corresponding negative affect.

The findings also provide preliminary support for the proposed interaction between intolerance of uncertainty and several maintenance factors described in the model of restricting anorexia nervosa proposed by Schmidt and Treasure (2006) and outlined earlier (see section 1.10). Firstly, patients described using the eating disorder to cope with and reduce uncertainty in many instances (e.g., engaging in dietary restriction to avoid the uncertainty associated with food consumption), suggesting an intolerance of uncertainty to potentially contribute to an additional "pro-anorectic belief" that the eating disorder is helpful for increasing one's sense of certainty. Secondly, an intolerance of uncertainty may also interact with the perfectionism/cognitive rigidity factor outlined by Schmidt and Treasure (2006), as patients' accounts suggest that perfectionism and a fear of making mistakes may affect the appraisal or experience of uncertainty (see section 2.4.2). Lastly, an intolerance of uncertainty may relate to the experiential avoidance factor of the model described by Schmidt and Treasure (2006), as avoidance was commonly identified by patients as a method of responding to uncertainty and corresponding affect.

The findings also provide preliminary support for the role of intolerance of uncertainty as a maintenance factor in the transdiagnostic cognitive-behavioural model of eating disorders developed by Fairburn and colleagues (2003) (see section 1.10). Patients' accounts suggest that an intolerance of uncertainty across a range of circumstances may trigger and maintain engagement in eating disorder behaviours as a mechanism for coping with uncertainty and its attendant distress. In the transdiagnostic

model, intolerance of uncertainty may therefore be positioned as a potentially non-specific factor that interacts with the core mechanisms of dietary restraint and other weight-control behaviour, which are proposed to maintain the core psychopathology of overvaluation of eating, shape, and weight, and their control (Fairburn et al., 2003). The findings also suggest that the relationship between intolerance of uncertainty and eating disorder symptoms may be bidirectional, in that an intolerance of uncertainty exacerbates eating disorder symptoms, and an eating disorder exacerbates the degree of actual and perceived uncertainty and the negativity of the succeeding response. That is, patients described an increase in the actual prevalence of uncertainty following onset of the eating disorder, as well as an increase in the attention directed towards uncertainty, the intensity of the negative emotional response, and the use of maladaptive strategies for coping. In sum, these preliminary findings support intolerance of uncertainty as a bi-directional, maintaining factor that can be incorporated within the model proposed by Fairburn and colleagues (2003).

The findings elucidating patients' perceptions and management of uncertainty also further our understanding of a range of specific eating disorder symptoms. That is, motivation for employing compensatory behaviours, checking behaviours, and rigidity or ritualised behaviours may be more fully understood through consideration of an intolerance of uncertainty. A theoretical framework incorporating intolerance of uncertainty may also increase understanding of factors such as indecision, social withdrawal, and distress associated with treatment, which are commonly observed in women with eating disorders. Each of these behaviours and factors may, at times, be the outcome of processes associated with an intolerance of uncertainty. Insight into intolerance of uncertainty and its relationship with common eating disorder symptoms suggests novel avenues for formulating treatment components.

Several further implications may be discerned regarding the treatment of eating disorders. Current interventions do not typically address patients' assessment, understanding, or management of uncertainty. The concept of an intolerance of uncertainty is likely to be foreign to the majority of patients (and treatment providers), and indeed most participants in the current research had not previously contemplated their experience with or tolerance for uncertainty. However, the findings suggest that an intolerance of uncertainty is likely to have significant implications for patients' day-to-day functioning and perceptions of treatment, recovery, and life beyond the eating disorder. A targeted treatment may benefit individuals with eating disorders by promoting (a) an increased understanding of the role and impact of uncertainty in their lives, (b) the use of more adaptive strategies for coping with uncertainty, and (c) effective challenging of unhelpful beliefs about uncertainty and replacement with more helpful beliefs promoting self-efficacy and the ability to effectively manage uncertainty.

Motivation to engage in treatment is often tenuous for individuals with eating disorders, however the provision of methods for reducing the distress associated with uncertainty is likely to be valued. Few participants described a benefit to uncertainty itself, but most described a benefit to learning how to cope with uncertainty. The wealth of coping strategies described by participants – both adaptive and maladaptive – may assist in the design of a treatment component targeting the management of uncertainty by patients.

2.4.8 Strengths and limitations of the study and avenues for future research. The current study possessed a number of strengths. Two features considered crucial to achieving the aims of the study included (a) the use of individual, semi-structured interviews, and (b) the application of interpretative phenomenological analysis. The use of one-to-one interviews allowed for collection of rich, detailed, and comprehensive accounts of each participant's perceptions and experiences of uncertainty. Semi-

structured interviews were considered to be most useful for obtaining the required data and indeed resulted in a wealth of information regarding each participant's experiences. Furthermore, IPA was considered far superior to quantitative methods in its ability to capture the genuine, lived experience of uncertainty for each participant. As acknowledged by Smith and Osborn (2008), IPA considers the respondent to be the "experiential expert", and indeed this is considered true in regard to the participants' experiences with uncertainty. The current research also addressed a recognised limitation of the study by Sternheim and colleagues (2011) pertaining to the lack of investigation into the experience of uncertainty prior to onset of the eating disorder. The current study sought to understand not only participants' experiences with uncertainty prior to onset of the disorder, but also across different stages of illness and treatment.

The design of the study had several strengths, but also possessed certain limitations that must be acknowledged. While favourable for facilitating depth, a small sample size is disadvantageous in terms of generalisability and representativeness. Hence, the current findings are to be viewed as a preliminary exploration of the nature and role of intolerance of uncertainty in the eating disorders context that can be used to generate hypotheses for investigation in larger-scale, quantitative studies.

The impact of researcher involvement must also be acknowledged due to the design of the study. Haslam and McGarty (2003) suggest that greater involvement of the researcher in collecting and analysing the data increases the risk of researcher bias. However, as Kuper and colleagues (2008) note, many qualitative researchers would not consider this as bias, but as a genuine part of the interaction - one that should be recognised but not necessarily removed. Regardless of how this influence is perceived, it should not preclude the involvement of the researcher in data production and analysis. Rather, it highlights the importance of reflexivity and transparency in the investigative

process (see Kuper, Lingard, & Levinson, 2008). Steps were taken to foster reflexivity, as outlined in the methodology section. Finally, it is useful to recognise that most research projects – even when employing a quantitative method of analysis – produce findings to be considered as a reasonable interpretation of the data, but not the sole possible interpretation (Haslam & McGarty, 2003). The participant extracts and supporting discussion allow the reader to form their own conclusions regarding the findings.

A number of useful avenues for future research can be identified. Firstly, the development and trial of a component of treatment targeting intolerance of uncertainty in the eating disorders context appears justified based on the current findings. A treatment component targeting intolerance of uncertainty in the anxiety disorders context was developed by Dugas and Ladouceur (2000), and found to lead to a reduction in both intolerance of uncertainty and worry when included in treatment for anxiety (Dugas & Ladouceur, 2000; Ladouceur, Dugas, et al., 2000). These promising findings highlight the potential utility of such a treatment, which could similarly be trialled in the eating disorders context. In the current study, participants appeared highly distressed by uncertainty and motivated to avoid uncertainty (typically in maladaptive ways), yet recognised the inevitable nature of uncertainty. Such a rationale may provide a basis for motivating patients to engage in treatment to reduce an intolerance of uncertainty. Secondly, whether an intolerance of uncertainty is present prior to onset of the eating disorder remains unclear, and the inclusion of an intolerance of uncertainty assessment in larger-scale longitudinal research would be beneficial for a more robust exploration of this possibility. Finally, as described earlier, a goal of interpretative phenomenological analysis is to produce detailed data with the aim of building towards more representative or generalisable findings (Smith & Osborn, 2008). As such, continued qualitative research into the perceptions of individuals with eating

disorders (across type, stage of illness, treatment, and gender) and how these perceptions compare to the perceptions of individuals with other psychological disorders is likely to further develop our understanding of the experience of uncertainty for people with eating disorders.

2.4.9 Conclusion. The current research has highlighted the frequent and intense experience of uncertainty for women with eating disorders, along with their characteristic responses. Inpatient treatment was recognised as presenting a number of additional uncertainties for patients, which is likely to have implications for treatment engagement. Adaptive and maladaptive strategies for coping with uncertainty were described, with all participants identifying the use of eating disorder behaviours as a coping mechanism. The findings suggest a tentative hypothesis that experiencing pathological levels of uncertainty in life may serve as a precursor to the eating disorder, and the use of eating disorder behaviours to cope with uncertainty underscores the potentially significant role of intolerance of uncertainty in the maintenance of eating disorder symptoms. The eating disorder in turn appears to exacerbate any pre-existing intolerance of uncertainty, thus suggesting a bi-directional relationship between intolerance of uncertainty and eating disorder pathology. In light of the current findings, the development and trial of a treatment component targeting intolerance of uncertainty in the eating disorder context appears warranted.

Chapter 3: Study Two - Examining the Relationship Between Intolerance of Uncertainty and Dietary Restraint in a Community-Based Sample

3.1 Introduction

Intolerance of uncertainty has been widely investigated in the anxiety disorders context and the potential significance of the construct is increasingly being recognised. Despite this increased attention, intolerance of uncertainty is yet to be adequately investigated in the eating disorders field (see Chapter 1 for a detailed discussion), which is surprising, given the overlap and shared features of anxiety and eating disorders. Indeed, a number of researchers have acknowledged the need for investigation into the shared aetiological factors and mechanisms of association between anxiety and eating disorders (Pallister & Waller, 2008). A greater understanding of the role of such variables in the eating disorder context, such as that of intolerance of uncertainty, may improve understanding of the maintenance of eating disorders and assist in the development of more effective, targeted treatments.

The present study comprises the second component of the current research project. The first study of the research program employed a qualitative methodology to conduct an in-depth exploration of the perceptions and experience of uncertainty for eating disorder patients. The findings suggested uncertainty to typically be perceived as highly distressing by patients with an eating disorder and to be potentially related to their eating disordered behaviours. While the first study sought to examine the rich and complex nature of the experience of uncertainty for patients with an eating disorder using an in-depth qualitative methodology, this second study aimed to elucidate a clear and precise depiction of the relationship between intolerance of uncertainty and a key aspect of eating disorder symptoms (i.e., dietary restraint) in a quantitative study using a community-based sample. The current study further aimed to attend more broadly to

the interrelationships of a range of constructs for women across the spectrum of eating disorder symptoms.

Investigation into the specific relationship between intolerance of uncertainty and dietary restraint is expected to achieve several goals. Firstly, while preliminary research has suggested a link between intolerance of uncertainty and problematic eating attitudes (Konstantellou & Reynolds, 2010), further research investigating intolerance of uncertainty in regard to a behavioural construct, namely dietary restraint, is likely to further support the link between intolerance of uncertainty and eating disorder symptoms. Dietary restraint was chosen as the outcome variable of investigation since a substantial body of literature has hypothesised dietary restraint to be central to the development and maintenance of eating disorders (Bulik, Sullivan, Carter, & Joyce, 1997; Fairburn, 2008; Haines & Neumark-Sztainer, 2006; Killen et al., 1996; Polivy & Herman, 1985; Stice, 2001; Stice & Agras, 1998), and is further hypothesised in the current research to form a potential coping response to an intolerance of uncertainty (described below).

Secondly, the establishment of covariation would satisfy the first, necessary condition in the process of investigating causality between the variables. According to Garber and Hollon (1991), three conditions must generally be met to draw conclusions regarding causality between two variables, namely, covariation, temporal antecedence, and non-spuriousness. Covariation is typically the first condition to be established, and although covariation between intolerance of uncertainty and worry has been demonstrated in multiple instances, a substantive link has not yet been established between intolerance of uncertainty and any specific eating disorder symptoms. Due to the paucity of research, this study was designed to specifically investigate covariation between intolerance of uncertainty and dietary restraint and, as such, is correlational in nature.

3.1.1 Replication and extension of previous research. The current study aimed to replicate and extend previous, preliminary research suggesting a link between intolerance of uncertainty and eating disorders (Konstantellou & Reynolds, 2010; see section 1.8). Konstantellou and Reynolds investigated the role of intolerance of uncertainty and meta-cognitions in a non-clinical sample and found individuals with problematic eating attitudes to score significantly higher on a measure of intolerance of uncertainty than individuals with normal eating attitudes. Konstantellou and Reynolds speculated that intolerance of uncertainty could serve as a risk factor for an eating disorder (predisposing individuals to need certainty, which may be achieved through an eating disorder) or as a maintaining factor (keeping the individual dependent on their eating disorder for the certainty that it creates). The need for further investigation into the link between intolerance of uncertainty and eating disorders was emphasised.

The current study sought to extend previous research by conducting a more detailed examination of both intolerance of uncertainty and eating disorder symptoms. Firstly, the current study incorporated a measure of intolerance of uncertainty specific to eating and weight in addition to a measure assessing intolerance of uncertainty in general, allowing for examination of the content specificity of intolerance of uncertainty (detailed below). In regards to eating disorder symptoms, the assessment of a broad range of eating disorder symptoms was included, as measured by the Eating Disorder Examination – Questionnaire (EDE-Q; Fairburn & Beglin, 1994), with a specific focus on dietary restraint as the outcome variable.

In addition to a more comprehensive assessment of both intolerance of uncertainty and eating disorder symptoms, a range of measures were also incorporated to investigate the role of potentially associated variables, including perfectionism, self-esteem, and negative affect. Each of these variables was included on the basis of previous literature indicating an association with eating disorder symptoms, and

research findings or a theoretical rationale suggestive of a possible link with intolerance of uncertainty (see section 1.9). Perfection and low self-esteem have both been widely investigated in the eating disorders field and found to co-occur with eating disorder symptoms (Bulik et al., 2003; Button et al., 1997; Cassin & von Ranson, 2005; Gual et al., 2002; Halmi et al., 2000; Kaye et al., 2004). In addition, a substantial body of research has linked negative affect with the development and maintenance of eating disorder symptoms (Cassin & von Ranson, 2005; Cooley & Toray, 2001; Stice, 2001; Stice & Agras, 1998; Stice, Killen, et al., 1998). In regard to intolerance of uncertainty, preliminary research suggests perfectionism and negative affect to correlate with intolerance of uncertainty in the same direction as the observed relationships with eating disorder symptoms (Buhr & Dugas, 2006; Sexton & Dugas, 2009). From a theoretical viewpoint, low self-esteem is also speculated to have an association with intolerance of uncertainty, with researchers suggesting that related constructs, such as a lowered sense of efficacy, may contribute to a high intolerance of uncertainty (Koerner & Dugas, 2008).

3.1.2 The content specificity of intolerance of uncertainty. The relative content specificity of the intolerance of uncertainty construct is yet to be fully understood, but is likely to have implications for future research and treatment development. In the eating disorders context, an intolerance of uncertainty may present as an intolerance of uncertainty in general or, alternatively, the focus may be narrowed to an intolerance of uncertainty specifically in the areas of eating, weight, and shape. The first study of the current research project investigated the experience of uncertainty for eating disorder patients and found uncertainty to be perceived as pervasive, identified across both eating and non-eating related contexts. While these findings may suggest a generalised intolerance of uncertainty, a significant proportion of the uncertainty reported was specifically in the domain of eating and weight. Thus the

current study aimed to explore both possibilities, with the inclusion of a general measure of intolerance of uncertainty and a measure of intolerance of uncertainty specific to the context of eating and weight.

Given the ongoing debate regarding the underlying factor structure of intolerance of uncertainty (see section 1.4 and 1.6), the measure of general intolerance of uncertainty chosen for this study was the complete 27-item version of the Intolerance of Uncertainty Scale (IUS; Buhr & Dugas, 2002). Eating- and weight-specific intolerance of uncertainty was assessed by the Intolerance of Uncertainty subscale of the Obsessive Beliefs Questionnaire – Eating Disorder Version (OBQ-EDV; Schembri, 2010). The OBQ-EDV is a 31-item self-report measure adapted from the Obsessive Beliefs Questionnaire (OBQ-44; Obsessive Compulsive Cognitions Working Group [OCCWG], 2005). Due to the recent development of the OBQ-EDV, little research has investigated the psychometric properties of the instrument. Preliminary psychometric analysis does, however, appear promising (Schembri, 2010; see section 3.2.2.7), and is currently the only known measure of intolerance of uncertainty specific to the domains of eating and weight. Based on these considerations, it was considered valuable to include this measure in order to examine the content specificity of intolerance of uncertainty with reference to eating disorder symptoms.

3.1.3 Proposed model of the role of intolerance of uncertainty in the eating disorders context. Detailed exploration into the mechanisms through which intolerance of uncertainty may be associated with dietary restraint was a further goal of the current study. A review of the literature, in combination with the findings from the first study of the current research project, suggests a potential role for intolerance of uncertainty to serve as a mediator of the relationship between shape and weight concerns and dietary restraint. The rationale for this model can be best explained through a discussion of the evidence and arguments for the link between (a) shape and

weight concerns and intolerance of uncertainty, and (b) intolerance of uncertainty and dietary restraint.

The proposed link between shape and weight concerns and intolerance of uncertainty is based on a sequence of arguments. Firstly, a large body of literature has identified difficulty tolerating emotions as a common feature of an eating disorder presentation (Anestis et al., 2007; Corstorphine, 2006; Corstophine et al., 2007; Fairburn et al., 2003; Harrison et al., 2009; Schmidt & Treasure, 2006). Given that shape and weight concerns often form an integral component of an eating disorder, it is expected that individuals with high shape and weight concerns (i.e., individuals displaying potentially sub-clinical eating disorder symptoms) may also exhibit an increased likelihood to experience difficulty tolerating emotions. Intolerance of uncertainty is considered to be theoretically consistent with difficulty tolerating emotions, since a specific component of intolerance of uncertainty involves the intolerance of the emotions and cognitions attached to uncertainty. Consequently, it is hypothesised that individuals with high shape and weight concerns will be more likely to present with an intolerance of uncertainty than individuals with less concerns regarding shape and weight.

In addition to shape and weight concerns being related to a general intolerance of uncertainty, shape and weight concerns may also trigger intolerance of uncertainty specific to eating, shape, and weight. This may occur along a similar pathway to that described for general intolerance of uncertainty, however the increased vulnerability to intolerance of uncertainty may narrow in focus into a domain of pre-existing concern for the individual, that is, the domain of eating, shape, and weight for individuals with shape and weight concerns. Alternatively, an intolerance of uncertainty specific to eating, shape, and weight may develop more directly as a result of the individual's high investment in shape and weight, which makes it especially difficult to tolerate the

possibility of adverse outcomes in this domain. For example, eating- or weight-related uncertainty may threaten the likelihood of attaining a particular, valued goal (e.g., the thin ideal) for an individual with shape and weight concerns, which correspondingly increases the perceived intolerability of such uncertainty.

The subsequent postulated link between intolerance of uncertainty and dietary restraint was also based on a number of considerations. Individuals with a high intolerance of uncertainty, by definition, experience a heightened emotional response when faced with uncertainty (see Greco & Roger, 2003). On the basis of this finding, it is hypothesised that individuals with an eating disorder will be likely to attempt to quell the amplified negative emotional state induced by uncertainty by avoiding or reducing the uncertainty. In the context of eating and weight, specific behaviour that may allow for avoidance of uncertainty includes reducing the volume and range of food consumed – that is, dietary restraint. While this is only one potential response to an intolerance of uncertainty, due to the central role of dietary restraint in eating disorders, restraint was chosen as the criterion variable for investigation in the current study. This decision is further supported by findings of the first study of the current research project, in which dietary restraint was commonly reported as a mechanism for coping with uncertainty by eating disorder patients.

3.1.4 Aims and hypotheses of the present study. In summary, the aims of this study were four-fold. The first aim was to extend previous research suggesting a link between intolerance of uncertainty and eating disorder symptoms by investigating the specific relationship between intolerance of uncertainty and dietary restraint in an Australian community-based sample. A community sample was utilised and age and gender criteria were set (women, aged 18-30) in order to acquire a sample of individuals with a range of eating, shape, and weight concerns. A non-clinical sample was considered appropriate for this study since research has found a range of eating disorder

symptoms to occur in non-clinical populations (Hay, Mond, Buttner, & Darby, 2008; Striegel-Moore et al., 2009). The use of a non-clinical sample therefore allowed for investigation across the continuum of severity for each construct.

The second aim was to extend previous research by distinguishing general intolerance of uncertainty from eating-and weight-specific intolerance of uncertainty in order to address questions raised in the literature regarding the specificity of the construct. The third aim was to investigate whether intolerance of uncertainty predicts dietary restraint over and above a number of previously established covariates of eating disorder symptoms – particularly variables also speculated to be relevant to an intolerance of uncertainty. These variables included perfectionism, self-esteem, and negative affect. Finally, the study sought to investigate mediational processes through which variables may combine to increase the likelihood of dietary restraint. More specifically, a model was tested in which intolerance of uncertainty (whether general or specific to eating and weight) mediates the relationship between shape and weight concerns and dietary restraint.

Based on the theoretical and empirical work outlined above, the following hypotheses were formulated:

1. Dietary restraint would be associated with both a general intolerance of uncertainty and with an intolerance of uncertainty specific to eating and weight.
2. Intolerance of uncertainty would predict dietary restraint after controlling for other relevant constructs (i.e., perfectionism, self-esteem, and negative affect).
3. Intolerance of uncertainty would mediate the relationship between shape and weight concerns and dietary restraint.

3.2 Method

3.2.1 Participants.

3.2.1.1 Overview of the sample. A sample of adult women from the Australian community was recruited to participate in the current study. Participants were recruited via online advertisements, word-of-mouth, and flyers posted at a university campus. Participants were offered $10 remuneration for their time. University undergraduate students undertaking first year psychology were given the option of course credit as an alternative form of remuneration if preferred. After the exclusion of 39 partially-completed responses and 47 participants with a body mass index (BMI = kg/m^2) in the overweight range or above (BMI $\geq$ 25), due to the possibly different interpretation of the Eating Disorder Examination-Questionnaire for this population, the final sample consisted of 164 women.

3.2.1.2 Gender. All participants in the current research were women. This inclusion criterion was set for two reasons. Firstly, the current study utilised a community sample and aimed to obtain a sample of participants spanning a broad range of eating disorder symptoms. As such, it was not considered appropriate to include a subset of men from the general population since men are more likely to cluster within a low range of eating disorder symptoms. Secondly, as women are significantly more likely to develop an eating disorder than men, findings from a sample of women were deemed to be more relevant for the eating disorder population (see APA, 2000; Fairburn et al., 2008).

3.2.1.3 Age. The age criterion for the current research restricted participation to individuals aged between 18 to 30 years, inclusive. This decision was made for two reasons. Firstly, the highest incidence of eating disorders is typically considered to occur in mid-late adolescence and early adulthood (APA, 2000; Fairburn et al., 2008), thus the restriction of data collection to participants within this age range suggests a

higher likelihood of gaining data that spans the range of eating disorder symptoms. Secondly, the prevalence and nature of intolerance of uncertainty may differ between adolescence and adulthood and, as such, it was not considered appropriate to combine both populations. Research exploring the distinct characteristics of intolerance of uncertainty in childhood and adolescence is limited (Boelen, Vrinssen, & van Tulder, 2010; Comer et al., 2009), however the prevalence of intolerance of uncertainty has been suggested to increase across the course of adolescence, peaking in late adolescence (Barahmand, 2008). Maintaining a distinction between adolescent and adult samples in empirical research is considered useful for understanding the intolerance of uncertainty construct as it presents across age groups, thus the current research chose to focus solely on an adult sample. The age of the final sample ranged between 18 and 30 years, with a mean age of 21.57 years (*SD* = 2.88). Figure 3.1 displays the distribution of participants by age.

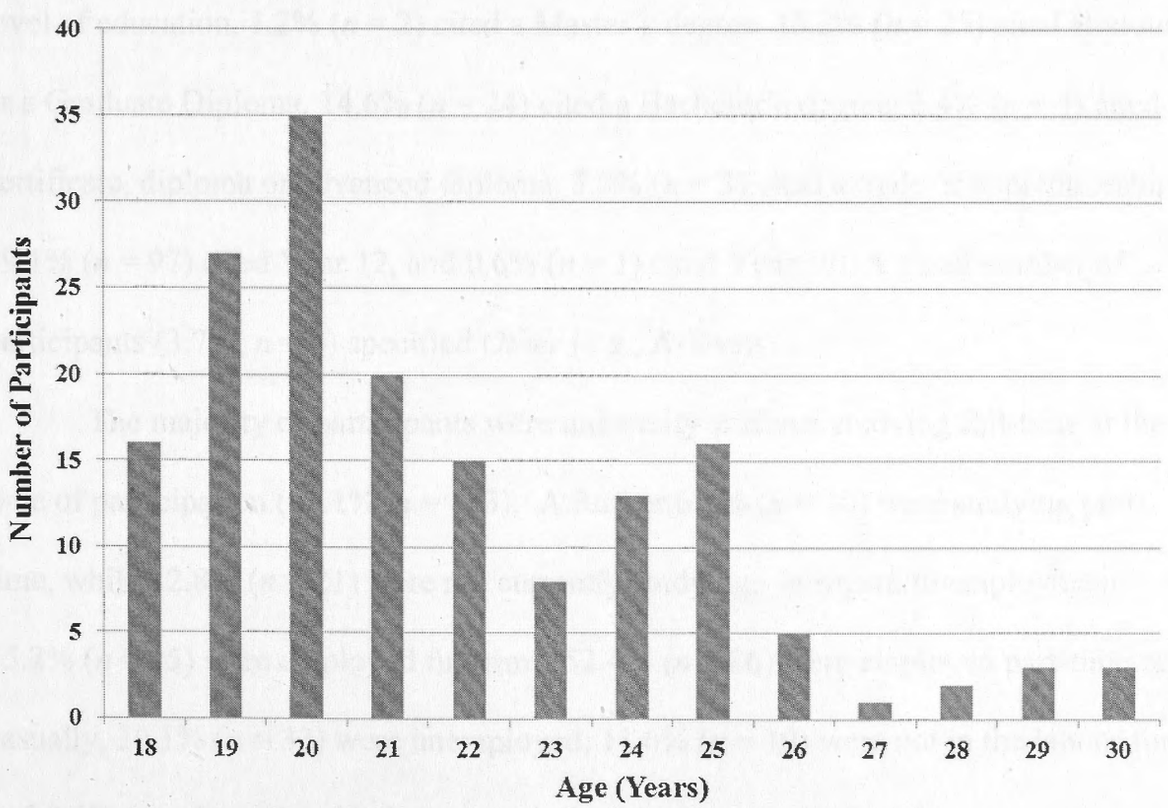

Figure 3.1. Distribution of participants by age (study two).

3.2.1.4 Region of birth. The majority of the sample was born in Australia (62.2%, $n = 102$), 47 participants (28.7%) were born in Asia, eight (4.9%) in Europe, three (1.8%) in North America, three (1.8%) in Africa, and one (0.6%) in New Zealand. For participants born outside of Australia, the mean length of time living in Australia was 5.55 years (range: 0.25 to 25.25 years). The data (i.e., country of birth and length of time living in Australia) therefore suggest that English was not the first language for a subset of participants.

3.2.1.5 Living arrangements. Almost thirty per cent ($n = 47$, 28.7%) of the sample were living with parents and/or other family members at the time of the study, 24.4% ($n = 40$) lived with friends or housemates, 17.1% ($n = 28$) lived with their partner, 16.5% ($n = 27$) lived alone, 12.8% ($n = 21$) lived in a university residence, and 0.6% ($n = 1$) was living with a host family.

3.2.1.6 Educational attainment and employment. Participants reported their highest level of completed education and current educational status. In regard to highest level of education, 1.2% ($n = 2$) cited a Master's degree, 15.2% ($n = 25$) cited Honours or a Graduate Diploma, 14.6% ($n = 24$) cited a Bachelor's degree, 2.4% ($n = 4$) cited a certificate, diploma or advanced diploma, 3.0% ($n = 5$) cited a trade or apprenticeship, 59.1% ($n = 97$) cited Year 12, and 0.6% ($n = 1$) cited Year 10. A small number of participants (3.7%, $n = 6$) specified *Other* (e.g., A-levels).

The majority of participants were university students studying full-time at the time of participation (81.1%, $n = 133$). A further 6.1% ($n = 10$) were studying part-time, while 12.8% ($n = 21$) were not currently studying. In regard to employment, 15.2% ($n = 25$) were employed full-time, 52.4% ($n = 86$) were employed part-time or casually, 20.1% ($n = 33$) were unemployed, 11.6% ($n = 19$) were not in the labour force, and 0.6% ($n = 1$) reported being on a scholarship, but not employed.

3.2.1.7 Diagnostic history. Participants were asked to report on whether they had ever been diagnosed with an eating disorder and, if so, what type. Refer to section 3.3.2.1 for a detailed description of the diagnostic history of the sample.

3.2.2 Measures. The current research incorporated a number of questions and standardised measures into a single questionnaire package, which participants completed online. Initial demographic information was requested, followed by a number of standardised questionnaires. Data regarding participants' weight, height, and any previous eating disorder diagnoses was also collected. The relevant measures are summarised in Table 3.1. The Obsessive Beliefs Questionnaire – Eating Disorder Version (OBQ-EDV; Schembri, 2010) is included in Appendix F. A description of the psychometric properties of each measure is provided below.

Table 3.1

Self-Report Measures

Measure	Authors (Year Published)
Demographic questions	Designed for the current study
Intolerance of Uncertainty Scale (IUS)	Buhr & Dugas (2002)
Depression Anxiety Stress Scale (DASS)	Lovibond & Lovibond (1995)
Rosenberg Self-Esteem Scale (RSE)	Rosenberg (1965)
Frost Multidimensional Perfectionism Scale (FMPS)	Frost et al. (1990)
Eating Disorders Examination-Questionnaire (EDE-Q)	Fairburn & Beglin (1994)
Obsessive Beliefs Questionnaire – Eating Disorder Version (OBQ-EDV)	Schembri (2010)

3.2.2.1 Demographic questions. Information pertaining to the participant's age, current living arrangements, and educational background was collected. Participants were also asked to provide their height and weight in order to calculate their BMI, and information regarding any previous eating disorder diagnoses was collected. Previous studies assessing the reliability and validity of self-reported height and weight in large samples of adult women have found self-report to be reasonably accurate, with substantial agreement in BMI categories between self-report and measured data (Craig & Adams, 2009; Lin, DeRoo, Jacobs, & Sandler, 2012). Women within the normal range of BMI reported most accurately, however, even for obese women, underestimates of weight were nearly always less than 10 per cent (Lin et al., 2012). Data was somewhat less accurate for certain subgroups, such as pregnant women and women over age 75 (Craig & Adams, 2009). Based on this assessment, self-report data was considered sufficient for the nature and purpose of the current study and the validity of the self-report data was not directly assessed.

3.2.2.2 Intolerance of Uncertainty Scale (IUS). The IUS is a 27-item self-report measure, created by Freeston and colleagues (1994) and translated to an English Version by Buhr and Dugas (2002). The IUS assesses multiple aspects of intolerance of uncertainty, including the belief that uncertainty is stressful, uncertain events should be avoided, and uncertainty leads to the inability to act. Respondents rate the degree to which items apply to them on a 5-point Likert scale, ranging from 1 (*not at all characteristic of me*) to 5 (*entirely characteristic of me*). Examples of items include, "Uncertainty makes me uneasy, anxious, or stressed", and, "My mind can't be relaxed if I don't know what will happen tomorrow". The IUS has previously been found to have excellent internal consistency, satisfactory test-retest reliability (over a 5-week period, r = .74), and convergent and discriminant validity in relation to symptom measures of worry, depression, and anxiety (Buhr & Dugas, 2002). Research by Norton (2005)

provides some support for the application of the IUS cross-racially. In the current study, the Cronbach's alpha coefficient for the IUS was .95.

3.2.2.3 Depression Anxiety Stress Scale (DASS-21). The short version of the DASS (Lovibond & Lovibond, 1995) is a 21-item self-report inventory that assesses negative emotional symptoms corresponding to the distinct affective states of depression, anxiety, and stress. Respondents rate their experience of each symptom on a 4-point Likert scale, ranging from 0 (*does not apply to me at all*) to 3 (*applies to me very much, or most of the time*). The instructions were modified in the current study to assess the applicability of statements *in general*, rather than *over the past week*, in order to gain a more stable measure of the experience of each symptom in line with the timeframe of the other measures utilised in the present study. This modification has been applied in previous research for the same purpose of assessing an individual's general tendency to experience the specified symptoms (e.g., Lovibond, 1998). In comparison to the longer, 42-item version of the DASS, research has found the DASS-21 to have a more precise factor structure, with smaller interfactor correlations (Antony, Bieling, Cox, Enns, & Swinson, 1998). The DASS-21 has shown satisfactory to excellent internal consistency (Cronbach's alpha coefficients = .87-.94 for the subscales) and concurrent validity (Antony et al., 1998). In the current study, the Cronbach's alpha coefficients for the three scales were: Depression = .88; Anxiety = .82; and Stress = .80.

3.2.2.4 Rosenberg Self-Esteem Scale (RSE). The RSE (Rosenberg, 1965) is a 10-item self-report measure of global self-esteem. Respondents rate their agreement with the 10 statements on a 4-point Likert scale, ranging from 1 (*strongly agree*) to 4 (*strongly disagree*), with scores ranging from 10 to 40. The statements assess components of self-concept and self-worth, including statements such as, "On the whole, I am satisfied with myself". The RSE is the most widely used self-report

measure of self-esteem (Gray-Little, Williams, & Hancock, 1997). Research investigating the RSE across 53 nations found a mean internal consistency (Cronbach's alpha) of .81 (Schmitt & Allik, 2005). Previous studies have also reported good internal consistency (.72-.90; see Gray-Little et al., 1997; Robins, Hendin, & Trzesniewski, 2001). Research has shown support for the convergent validity of the RSE and related constructs (e.g., extraversion and neuroticism) and discriminant validity evidence (e.g., openness; Schmitt & Allik, 2005). The Cronbach's alpha coefficient for the RSE in the current study was .91.

3.2.2.5 Frost Multidimensional Perfectionism Scale (FMPS). The FMPS is a 35-item self-report measure developed by Frost and colleagues (1990) and designed to assess multiple dimensions of perfectionism. Respondents indicate their extent of agreement or disagreement with various statements using a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The original article proposed six subscales, namely Concern Over Mistakes, Personal Standards, Parental Expectations, Parental Criticism, Doubting of Actions, and Organisation, and subsequent research has supported this factor structure (Parker & Adkins, 1995). However, mixed results have since been reported regarding the factor structure of the FMPS (e.g., Khawaja & Armstrong, 2005; Stöber, 1998). Despite this, satisfactory internal consistency has been reported for the subscales (.77 - .93) and the overall scale (.90; Frost et al., 1990). Satisfactory convergent and discriminant validity evidence has also been demonstrated (see Frost et al., 1990). In the current study, the Cronbach's alpha coefficients for the six scales were: .92 for Concern Over Mistakes, .83 for Personal Standards, .87 for Parental Expectations, .82 for Parental Criticism, .80 for Doubting of Actions, and .90 for Organisation. The Cronbach's alpha coefficient for the total score was .93.

3.2.2.6 Eating Disorder Examination-Questionnaire (EDE-Q). The EDE-Q is a self-report questionnaire developed by Fairburn and Beglin (1994) and based on the

Eating Disorder Examination interview (EDE; Fairburn & Cooper, 1993). It is designed to assess a range of eating disorder symptoms, focusing on the past 28 days. A 7-point, forced-choice rating scheme is used for items addressing attitudinal features. The occurrence and frequency of various eating disorder behaviours are also assessed. The scale is comprised of four subscales, namely, Restraint, Eating Concern, Shape Concern, and Weight Concern. However, exploratory factor analysis has indicated a need for further examination of the factor structure of the EDE-Q (Peterson et al., 2007). Despite this, the EDE-Q has shown satisfactory internal consistency in previous studies for both the total score (e.g., .90; Peterson et al., 2007) and the subscales (e.g., .70 - .94; Luce & Crowther, 1999; Peterson et al., 2007). Mond, Hay, Rodgers, Owen, and Beumont (2004) reported good concurrent validity and acceptable criterion validity for the EDE-Q.

In a comparison of the EDE interview and the EDE-Q, some discrepancy was found in the assessment of certain, somewhat ambiguous features (e.g., binge eating; Fairburn & Beglin, 1994). The discrepancy suggests higher ratings to result from the self-report measure, indicating that the EDE-Q may overestimate the frequency of some features (Fairburn & Beglin, 1994). Despite this consideration, the EDE-Q is considered a psychometrically sound, easy-to-administer tool for assessing eating disorder symptoms in the community (Luce & Crowther, 1999; Mond et al., 2004), and Australian norms have recently been developed (Mond, Hay, Rodgers, & Owen, 2006). The Cronbach's alpha coefficient for the total score was .96. The Cronbach's alpha coefficient was .86 for the Restraint subscale, .86 for the Eating Concern subscale, .87 for the Weight Concern subscale, and .93 for the Shape Concern subscale.

3.2.2.7 Obsessive Beliefs Questionnaire –Eating Disorder Version (OBQ-EDV). The OBQ-EDV (Schembri, 2010) is a 31-item self-report measure modified from the Obsessive Beliefs Questionnaire (OBQ-44; Obsessive Compulsive Cognitions

Working Group [OCCWG], 2005). The measure assesses obsessive beliefs in the domains of eating, shape, and weight. Respondents rate their extent of agreement with various statements on a 7-point Likert scale, ranging from 1 (*disagree very much*) to 7 (*agree very much*). The scale is comprised of four subscales, namely, Responsibility/Threat Estimation, Importance/Control of Thoughts, Perfectionism, and Intolerance of Uncertainty. The Intolerance of Uncertainty subscale in particular assesses the degree of anxiety and distress experienced as a result of uncertainty regarding the characteristics of food or the consequences of food consumption (Schembri, 2010). Preliminary analysis reported high internal consistency for the total score (.94) and subscales (.84 - .89; Schembri, 2010). Content validity was reported, and criterion validity evidence was demonstrated for the OBQ-EDV and related constructs (e.g., OBQ-44; see Schembri, 2010). The Cronbach's alpha coefficient for the total score in the current study was .96. The Cronbach's alpha coefficient was .91 for the Intolerance of Uncertainty subscale, .91 for the Importance and Control over Thoughts subscale, .91 for the Perfectionism subscale, and .94 for the Responsibility/Threat Estimation subscale.

3.2.3 Procedure.

3.2.3.1 Overview. Approval to conduct this study was obtained from the Australian National University Human Research Ethics Committee (see Appendix G for copies of approval to conduct the research, the Information Sheet, Consent Form, and Debrief Sheet). The questionnaire was made available online, accessible via a direct link provided to participants. Informed consent was obtained from each participant.

3.2.3.2 Recruitment and debriefing of the sample. Individuals were invited to participate in the study via flyers posted around the university campus and word-of-mouth (see Appendix H). In order to be eligible for participation, individuals were required to be female and aged between 18 and 30, inclusive. Individuals were not

coerced to participate in any way and were able to withdraw at any time. The final page of the online questionnaire provided a list of support services and the contact details of the researchers and ethics committee for any questions or concerns following participation.

3.2.3.3 Development of the online questionnaire. The online questionnaire was developed through the Qualtrics website (www.qualtrics.com; Qualtrics, 2010). Qualtrics possesses Statement on Auditing Standards (SAS) Number 70 Certification, which is an auditing standard developed by the American Institute of Certified Public Accountants. It meets privacy standards created by the Health Insurance Portability and Accountability Act. All accounts are hidden behind passwords and data is protected with real-time data replication (Qualtrics, 2010).

The initial two pages of the online questionnaire provided a brief summary of the research, the voluntary nature of participation, inclusion criteria, and contact details for the primary researcher (Refer to Appendix G for details). The third page requested information regarding participants' demographic information. Thereafter, the self-report measures were presented. Participants were also asked to provide their height, weight, and whether or not they had ever been diagnosed with an eating disorder (and if so, which type). Finally, an information page was displayed to debrief participants on the nature of the study.

A code was provided to participants to allow them to gain remuneration for participation. This code was in no way linked to their particular questionnaire, to ensure anonymity. A progress bar allowed participants an indication of their progress in the questionnaire.

Following completion of the online questionnaire, data was automatically uploaded to the Qualtrics server. Only the primary researcher had access to the data on

the Qualtrics server. All data was subsequently stored on a password protected USB Flash drive.

3.3 Results

3.3.1. Data screening and cleaning. All analyses of the data were conducted using the Statistical Package for the Social Sciences (SPSS), Version 18.0. Data was transferred electronically from Qualtrics to an SPSS spreadsheet, avoiding any possible error resulting from the input of data. All relevant variables were screened for missing values, normality, linearity, homoscedasticity, multicollinearity, and the presence of univariate and multivariate outliers using procedures outlined in Tabachnick and Fidell (2007).

3.3.1.1 Missing or implausible data. Unfinished responses were deleted from the dataset ($n = 39$). Based on the preliminary data entered by these participants, this excluded subset did not differ significantly from the subset retained for analysis. The online survey required responses to be filled before the survey could be submitted, thus no data was missing from the remaining respondents. Descriptives were utilised to investigate the possibility of out-of-range or implausible values for the remainder of the dataset. All data was within the ranges specified, the means and standard deviations were plausible, and no out-of-range values existed for discrete variables.

3.3.1.2 Assumption testing. Exploratory data analysis was undertaken for all variables to ensure that the statistical assumptions underlying the subsequent procedures were not violated. To investigate normality, the skewness and kurtosis levels for each variable were calculated and the histograms were examined. Tabachnick and Fidell (2007) suggest that examination of the histograms is a more appropriate assessment of skewness than formal inference tests for large sample sizes, due to the sensitivity of the formal tests. Tabachnick and Fidell (2007) further note that, for large samples, statistically significant skewness often does not deviate from normality insofar as to

make a substantive difference in the analysis. For the independent variables in the current study, the presence of skewness or kurtosis was considered acceptable and appropriate based on the expected curve of the sample. The degree of skewness for the dependent variable required additional consideration, as the Eating Disorder Examination-Questionnaire Restraint subscale was significantly positively skewed. A square root transformation was considered most appropriate and this successfully corrected the skew. Subsequent analyses were performed for both the transformed and untransformed data, however the transformation did not significantly affect the results. Given the relative ease of interpretation for the untransformed data, only these results are presented here.

Linearity and homoscedascity were assessed through the inspection of bivariate scatterplots in conjunction with descriptive data output. These assumptions were not considered to be violated for any variable. Multicollinearity and singularity were assessed by investigating a correlation matrix consisting of all the relevant variables. No redundancy was found, that is, no measures were unexpectedly highly correlated (above .90).

3.3.1.3 Outliers. No univariate outliers were found. Mahalanobis distances were utilised to investigate the possibility of multivariate outliers. Regression analysis was conducted to determine the Mahalanobis distance for each participant, which was subsequently evaluated using the critical Chi-Squared value (Tabachnick & Fidell, 2007). No multivariate outliers were found with a $p < .001$. Cook's distance did not exceed 0.40 for any variables. Further examination of the data set resulted in the exclusion of one case assumed to be an illegitimate entry (highly similar numerical values were reported for each item in each scale, despite reverse scoring).

3.3.2 Descriptive statistics. The final sample consisted of 164 participants. Descriptive statistics for each relevant measure (including total and subscale scores) are presented in Table 3.2.

Table 3.2

Descriptive Statistics for Variables

Variable	Min.	Max.	Mean	SD	Skew (.19[a])	Kurtosis (.38[b])
1. IUS total score	33.00	110.00	63.59	18.22	.37	-.67
2. DASS depression	14.00	56.00	22.72	8.41	1.13	.84
3. DASS anxiety	14.00	48.00	23.16	7.75	.74	-.20
4. DASS stress	14.00	52.00	27.18	7.58	.55	.08
5. RSE total score	13.00	40.00	29.23	5.59	-.19	-.26
6. FMPS total score	40.00	130.00	81.64	19.74	.06	-.63
7. EDE-Q total score	1.00	6.75	2.70	1.38	.91	-.08
8. EDE-Q restraint	1.00	6.80	2.49	1.49	.93	-.12
9. EDE-Q eating concern	1.00	6.40	1.99	1.23	1.64	2.40
10. EDE-Q shape concern	1.00	7.00	3.39	1.64	.55	-.84
11. EDE-Q weight concern	1.00	7.00	2.92	1.62	.78	-.43
12. OBQ-EDV-IU	5.00	35.00	13.52	7.65	.72	-.35

Note. IUS: Intolerance of Uncertainty Scale; DASS: Depression Anxiety Stress Scale; RSE: Rosenberg Self-Esteem Scale; FMPS: Frost Multidimensional Perfectionism Scale; EDE-Q: Eating Disorder Examination-Questionnaire; OBQ-EDV-IU: Obsessive Beliefs Questionnaire-Eating Disorder Version Intolerance of Uncertainty subscale; $N = 164$.

[a] Skew (standard error)

[b] Kurtosis (standard error)

3.3.2.1 Height, weight, and eating disorder diagnoses. Participants were asked to specify their height, weight, and whether they had ever been diagnosed with an eating disorder (and if so, what type). Participants ranged in height from 150 cm to 184 cm, with a mean of 165.0 cm (*SD* = 6.9). Participants ranged in weight from 42.5 kg to 75 kg, with a mean of 57.48 kg (*SD* = 6.9). Body Mass Index ranged from 16.33 to 24.92, representing participants within the underweight and normal weight ranges (following the removal of participants with a BMI in the overweight range, as indicated above). The mean BMI was in the normal range at 21.08 (*SD* = 1.9).

In regards to an eating disorder diagnosis, 5.5% (*n* = 9) indicated that they had previously been diagnosed with an eating disorder. Of these nine participants, four specified this diagnosis to be Anorexia Nervosa, one specified Bulimia Nervosa, three specified EDNOS/other, and one specified both Anorexia Nervosa and Binge Eating Disorder, occurring at different times.

3.3.2.2 Correlation analyses. Correlation analyses indicated significant relationships of varying degree between each of the relevant variables. These correlations are presented in Table 3.3.

Table 3.3

Correlation Analyses

	Correlations										
Variable	1	2	3	4	5	6	7	8	9	10	11
1. IUS total score	1.00										
2. DASS Depression	.52										
3. DASS Anxiety	.52	.60									
4. DASS Stress	.63	.67	.75								
5. RSE total score	-.55	-.78	-.55	-.57							
6. FMPS total score	.53	.48	.49	.50	-.60						
7. EDE-Q total score	.25	.42	.41	.36	-.44	.49					
8. EDE-Q Restraint	.14[#]	.29	.28	.22	-.30	.39	.91				
9. EDE-Q Eating Concern	.25	.39	.40	.34	-.41	.44	.89	.75			
10. EDE-Q Shape Concern	.27	.44	.41	.37	-.46	.48	.95	.80	.78		
11. EDE-Q Weight Concern	.26	.43	.41	.38	-.43	.49	.95	.79	.78	.90	
12. OBQ-EDV-IU	.34	.39	.37	.28	-.44	.52	.81	.76	.75	.75	.75

Note. All correlations were statistically significant ($p < .01$) except where stated otherwise ([#] not significant). IUS: Intolerance of Uncertainty Scale; DASS: Depression Anxiety Stress Scale; RSE: Rosenberg Self-Esteem Scale; FMPS: Frost Multidimensional Perfectionism Scale; EDE-Q: Eating Disorder Examination-Questionnaire; OBQ-EDV-IU: Obsessive Beliefs Questionnaire-Eating Disorder Version Intolerance of Uncertainty subscale; $N = 164$.

3.3.3 Distinction of variables. Due to the high correlations and theoretical association between specific constructs being considered, preliminary exploratory factor analysis was undertaken to investigate the distinctiveness of a number of measures. Both the eating- and weight- specific and the general measure of intolerance of uncertainty were subjected to exploratory factor analyses to determine whether the measures were distinct from a number of other constructs. A detailed exploration of these relationships was not the purpose of the current study, thus a condensed version of the findings is reported here and further investigation in future research is advised.

Firstly, the intolerance of uncertainty subscale of the Obsessive Beliefs Questionnaire – Eating Disorder Version (OBQ-EDV) was investigated to determine whether it may be considered as distinct from potentially related constructs, namely two subscales of the Frost Multidimensional Perfectionism Scale (FMPS; Concern Over Mistakes and Doubting of Actions) and four subscales of the Eating Disorder Examination – Questionnaire (EDE-Q; Eating Concern, Shape Concern, Weight Concern, and Restraint). The results of this analysis supported the use of the OBQ-EDV Intolerance of Uncertainty subscale as distinct from the FMPS and EDE-Q subscales.

Secondly, the Intolerance of Uncertainty Scale (IUS) was investigated to determine whether it may also be considered distinct from potentially related constructs, namely two subscales of the Frost Multidimensional Perfectionism Scale (FMPS; Concern Over Mistakes and Doubting of Actions). The results of this analysis also supported the use of the IUS as distinct from the FMPS subscales.

3.3.4 The relationship between demographic variables and dietary restraint. Data regarding demographic variables was collected to investigate whether these variables are related to dietary restraint and therefore may need to be controlled for in the main analyses. The demographic variables included age, region of birth, studying

status (i.e., whether currently studying at university), employment status, living arrangement, and education (i.e., highest level of education completed). Body mass index was also investigated as a potential covariate, based on previous research reporting a relationship between BMI and eating disorder symptoms, including dietary restraint (e.g., Killen, Hayward, et al., 1994), and research demonstrating the importance of controlling for BMI when investigating other variables (e.g., ethnic differences in eating disorder symptoms; Arriaza & Mann, 2001).

Univariate analyses were conducted to determine which demographic variables to include in the multivariate analyses. The univariate analyses revealed one variable, BMI, to demonstrate a significant relationship with dietary restraint, as measured by scores on the Restraint subscale of the EDE-Q, $F(1, 137) = 4.02$, $p < .05$, with higher BMI associated with higher levels of dietary restraint. The following variables were not significant predictors of dietary restraint: age ($p = .098$), region of birth ($p = .622$), living arrangement ($p = .441$), studying status ($p = .819$), employment status ($p = .791$), or education ($p = .134$). No significant interaction effects were found. Due to the significant finding, BMI was included in subsequent analyses.

3.3.5 Correlations between intolerance of uncertainty and dietary restraint. In order to test the first hypothesis, correlational analyses were conducted to assess the relationship between both general and eating/weight-specific intolerance of uncertainty and dietary restraint. The relationship between general intolerance of uncertainty (as measured by the total score on the IUS; $M = 63.6$, $SD = 18.2$) and dietary restraint (as measured by the Restraint subscale score on the EDE-Q; $M = 2.5$, $SD = 1.5$) was investigated using Pearson product-moment correlation coefficients. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. A significant correlation was not found between the variables ($r = .14$, $n = 164$, $p = .06$).

The relationship between intolerance of uncertainty specific to eating and weight (as measured by the OBQ-EDV Intolerance of Uncertainty subscale; $M = 13.5$, $SD = 7.7$) and dietary restraint (as measured by the Restraint subscale score on the EDE-Q; $M = 2.5$, $SD = 1.5$) was also investigated using Pearson product-moment correlation coefficient. Again, preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. A large, positive correlation was found between the two variables, $r = .76$, $n = 164$, $p < .001$, with high levels of intolerance of uncertainty specific to eating and weight associated with higher levels of dietary restraint. See Tables 3.4 and 3.5 for details.

Table 3.4

Descriptive Statistics for the IUS, EDE-Q Restraint and OBQ-EDV-IU variables

Measure	Mean	Standard Deviation
IUS	63.59	18.22
OBQ-EDV-IU	13.52	7.65
EDE-Q Restraint subscale	2.49	1.49

Note. IUS: Intolerance of Uncertainty Scale; EDE-Q: Eating Disorder Examination-Questionnaire; OBQ-EDV-IU: Obsessive Beliefs Questionnaire-Eating Disorder Version Intolerance of Uncertainty subscale; $N = 164$.

Table 3.5

Correlation Analyses for the IUS, EDE-Q Restraint and OBQ-EDV-IU variables

	IUS	OBQ-EDV-IU	EDE-Q Restraint
IUS	1	.335**	.144
OBQ-EDV-IU		1	.756**
EDE-Q Restraint subscale			1

Note. IUS: Intolerance of Uncertainty Scale; OBQ-EDV-IU: Obsessive Beliefs Questionnaire-Eating Disorder Version Intolerance of Uncertainty subscale; EDE-Q: Eating Disorder Examination-Questionnaire; $N = 164$.

* $p < .01$, ** $p < .001$

The correlation between the OBQ-EDV Intolerance of Uncertainty subscale and the EDE-Q Restraint subscale ($r = .76$, $n = 164$, $p < .001$) was significantly larger ($p < .001$) than the correlation between the IUS and the EDE-Q Restraint subscale ($r = .14$, $n = 164$, $p = .06$) [NB. Macro obtained from Preacher & Hayes, 2008b], suggesting dietary restraint to correlate more strongly with intolerance of uncertainty specific to eating and weight than with general intolerance of uncertainty. In regards to the relationship between the two measures of intolerance of uncertainty themselves, a medium correlation was found between the IUS ($M = 63.6$, $SD = 18.2$) and the Intolerance of Uncertainty subscale of the OBQ-EDV ($M = 13.5$, $SD = 7.7$), $r = .34$, $n = 164$, $p < .001$.

In order to examine these relationships in greater detail, with consideration of the demographic variables highlighted earlier, a regression analysis was undertaken. Hierarchical regression was utilised to examine the unique contributions of intolerance of uncertainty in general (as measured by the IUS) and intolerance of uncertainty specific to eating and weight (as measured by the OBQ-EDV Intolerance of Uncertainty subscale) in predicting variance in dietary restraint (as measured by the EDE-Q

Restraint subscale) after controlling for BMI in the model. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. The resulting model found both intolerance of uncertainty in general (*beta* = -.109, $p < .05$) and intolerance of uncertainty specific to eating and weight (*beta* = .787, $p < .001$) to uniquely predict variance in dietary restraint (see Table 3.6). After inclusion of the measures of intolerance of uncertainty, BMI remained significant ($p < .05$). The total model explained 59.5% of the variance in dietary restraint. The results support the findings of the correlational analyses, that is, that intolerance of uncertainty specific to eating and weight is more strongly linked to dietary restraint than intolerance of uncertainty in general.

Table 3.6

Summary of Hierarchical Multiple Regression Analysis for Variables Predicting Scores on the EDE-Q Restraint subscale

Variables	R^2	Adjusted R^2	ΔR^2	*B*	S. E. *B*	ß
Step 1	.02	.02	.02*			
BMI				.12	.06	.16*
Step 2	.59	.59	.57**			
IUS				-.01	.00	-.11*
OBQ-EDV-IU				.15	.01	.79**

Note. EDE-Q: Eating Disorder Examination-Questionnaire; BMI: Body Mass Index; IUS: Intolerance of Uncertainty Scale; and OBQ-EDV-IU Subscale: Obsessive Beliefs Questionnaire – Eating Disorder Version Intolerance of Uncertainty subscale; *N* = 164.

* $p < .05$, ** $p < .001$

3.3.6 Intolerance of uncertainty, dietary restraint and associated variables.

In order to address the second hypothesis, hierarchical regression was employed to

examine whether intolerance of uncertainty specific to eating and weight (as measured by the OBQ-EDV Intolerance of Uncertainty subscale) could uniquely predict any variance in dietary restraint (as measured by the EDE-Q Restraint subscale) after the inclusion of weight concerns, shape concerns, self-esteem, perfectionism, and negative affect in the model (as measured by the EDE-Q Shape Concern subscale, EDE-Q Weight Concern subscale, FMPS, RSE, and DASS subscales, respectively). Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. Body mass index was controlled for in the model. The resulting model, which included BMI, intolerance of uncertainty specific to eating and weight, shape concerns, weight concerns, perfectionism, self-esteem, and negative affect explained 72.5% of the variance in dietary restraint (see Table 3.7).

In order to control for relevant demographic variables, BMI was entered at Step 1 (explaining 2.4% of the variance in dietary restraint). Shape concerns, weight concerns, perfectionism, self-esteem, and negative affect were entered at Step 2 and explained an additional 67.1% of the variance in dietary restraint (with a total of 69.6% of variance explained). After entry of intolerance of uncertainty specific to eating and weight (as measured by the OBQ-EDV Intolerance of Uncertainty subscale) at Step 3, the total variance explained by the model as a whole was 72.5%, F (9, 154) = 45.10, $p <$ .001. Intolerance of uncertainty specific to eating and weight explained an additional 2.9% of the variance in dietary restraint, after controlling for all other constructs, R squared change = .03, F change (1, 154) = 16.47, $p < .001$. In the final model, only BMI (*beta* = -.104, p < .05), shape concerns (*beta* = .385, $p < .001$), weight concerns (*beta* = .336, $p < .01$), and intolerance of uncertainty specific to eating and weight (*beta* = .298, $p < .001$) were statistically significant.

Table 3.7

Summary of Hierarchical Multiple Regression Analysis for Variables Predicting Scores on the EDE-Q Restraint Subscale

Variables	R^2	Adjusted R^2	ΔR^2	*B*	S. E. *B*	ß
Step 1	.02	.02	.02*			
BMI				.12	.06	.16*
Step 2	.70	.68	.67**			
EDE-Q SC				.45	.09	.50**
EDE-Q WC				.43	.10	.46**
FMPS				.00	.01	.04
DASS-D				.00	.01	-.02
DASS-A				.00	.01	-.03
DASS-S				-.01	.02	-.06
RSE				.02	.02	.08
Step 3	.73	.71	.03**			
OBQ-EDV-IU				.06	.01	.30**

Note. BMI: Body Mass Index; EDE-Q: Eating Disorder Examination-Questionnaire (SC: Shape Concern subscale; WC: Weight Concern subscale); FMPS: Frost Multidimensional Perfectionism Scale; DASS: Depression Anxiety Stress Scale (-D: Depression subscale; -A: Anxiety Subscale; -S: Stress subscale); RSE: Rosenberg Self-Esteem Scale; and OBQ-EDV-IU: Obsessive Beliefs Questionnaire – Eating Disorder Version Intolerance of Uncertainty subscale; $N = 164$.

* $p < .05$, ** $p < .001$

Interpretation of the coefficients revealed that participants with higher scores on measures pertaining to intolerance of uncertainty specific to eating and weight, shape concerns, and weight concerns reported a greater degree of dietary restraint, and participants with a lower BMI also reported a greater degree of dietary restraint. The semipartial correlation coefficients indicated that intolerance of uncertainty specific to eating and weight uniquely explained the greatest amount of variability in dietary restraint (2.9%). Shape concerns uniquely explained 2.6% of the variance in dietary restraint, and weight concerns accounted for 1.8% of the variance.

3.3.7 Intolerance of uncertainty as a mediator of shape and weight concerns and dietary restraint. In order to address the third hypothesis, mediation analysis was conducted to investigate whether intolerance of uncertainty specific to eating and weight may partially mediate the relationship between shape and weight concerns and dietary restraint. Body mass index was controlled for in a preliminary analysis of the data, but did not change the pattern of results and did not reach statistical significance in the final model, thus it is not included in the following analysis.

In order to investigate the possible mediating role of the OBQ-EDV Intolerance of Uncertainty subscale, sequential regression analyses and testing of the indirect effect were undertaken. The four-step procedure outlined by Baron and Kenny (1986) and Judd and Kenny (1981) for establishing mediation was followed. Assumptions regarding linearity, multicollinearity, normality, and homogeneity of variance were verified.

The model includes two independent variables. Due to this, the INDIRECT macro by Preacher and Hayes (2008b) was used to estimate the coefficients in this model by treating the second independent variable as a covariate and then reversing this to gain information on the indirect effect for both independent variables. In using this method, it must be assumed that there is no measurement error in the OBQ-EDV

Intolerance of Uncertainty subscale score and that there are no unmeasured common causes of the OBQ-EDV Intolerance of Uncertainty subscale score and EDE-Q score. Finally, it must be assumed that the EDE-Q score does not cause the OBQ-EDV Intolerance of Uncertainty subscale score.

Three sets of regression analyses were conducted to test the conditions for mediation. Firstly, dietary restraint was regressed on shape concerns and weight concerns to test for total effects. Both shape concerns (beta = .42, $p < .001$) and weight concerns (beta = .34, $p < .01$) showed a significant relationship with dietary restraint, satisfying the first condition for mediation (that is, that the independent variables is significantly related to the dependent variable). Secondly, intolerance of uncertainty specific to eating and weight was regressed on shape concerns and weight concerns (see Table 3.8). A positive relationship was found between shape concerns and intolerance of uncertainty specific to eating and weight (beta = 1.97, $p < .001$) and between weight concerns and intolerance of uncertainty specific to eating and weight (beta = 1.72, $p < .005$), satisfying the second condition for mediation (that is, that the independent variables are significantly related to the mediator). Finally, dietary restraint was regressed on intolerance of uncertainty specific to eating and weight after controlling for shape and weight concerns in the analysis (see Table 3.9), satisfying the third condition, namely that the mediator is significantly related to the dependent variable. Shape concerns, weight concerns and intolerance of uncertainty specific to eating and weight together accounted for 70.3% of the variance in dietary restraint, F (3, 160) = 126.26, $p < .001$.

Table 3.8

Summary of Multiple Regression Analysis for Variables Predicting Scores on the OBQ-EDV-IU

Variables	R^2	Adjusted R^2	*B*	S. E. *B*	ß
Model	.59	.59			
EDE-Q SC			1.97	.53	.43***
EDE-Q WC			1.72	.54	.37**

Note. OBQ-EDV-IU: Obsessive Beliefs Questionnaire – Eating Disorder Version Intolerance of Uncertainty subscale; EDE-Q: Eating Disorder Examination-Questionnaire (SC: Shape Concern subscale; WC: Weight Concern subscale); $N = 164$.

** $p < .01$, *** $p < .001$

Table 3.9

Summary of Hierarchical Multiple Regression Analysis for Variables Predicting Scores on the EDE-Q Restraint Subscale

Variables	R^2	Adjusted R^2	ΔR^2	*B*	S. E. *B*	ß
Step 1	.66	.66	.66***			
EDE-Q SC				.42	.10	.47***
EDE-Q WC				.34	.10	.37**
Step 2	.70	.70	.04***			
EDE-Q SC				.30	.09	.33**
EDE-Q WC				.23	.09	.25*
OBQ-EDV-IU				.06	.01	.32***

Note. EDE-Q: Eating Disorder Examination-Questionnaire (SC: Shape Concern subscale; WC: Weight Concern subscale); OBQ-EDV-IU: Obsessive Beliefs Questionnaire – Eating Disorder Version Intolerance of Uncertainty subscale; $N = 164$.

* $p < .05$, ** $p < .01$, *** $p < .001$

Bootstrapping was utilised to obtain a confidence interval for the indirect effect and was chosen over the Sobel test, due to the assumption made regarding the shape of the sampling distribution of the indirect effect when conducting the Sobel test (Preacher & Hayes, 2008a). The indirect effect of shape concerns on dietary restraint through intolerance of uncertainty specific to eating and weight was significant (beta = .12, *SE* = .05; 95% *CI* = [.045, .252]). The indirect effect of weight concerns on dietary restraint through intolerance of uncertainty specific to eating and weight was also significant (beta = .11, *SE* = .05; 95% *CI* = [.031, .225]). Following inclusion of the mediator, both direct and indirect effects were noted in the relation between weight concerns and dietary restraint (direct effect beta = .23, $p < .05$), and shape concerns and dietary restraint (direct effect: beta = .30, $p < .005$). That is, the effect of shape and weight concerns on dietary restraint after controlling for intolerance of uncertainty specific to eating and weight remained significantly different from zero, indicating partial mediation.

It is important to note, however, that this does not conclusively establish partial mediation, as there are other possible models consistent with the data available that may be suggested (Baron & Kenny, 1986; Judd & Kenny, 1981). However, the hierarchical regression model employed in this study does reflect current theory which suggests shape and weight concerns to be primary, fundamental constructs underlying eating disorder symptoms (entered as Block 1), with intolerance of uncertainty posited as a maintaining factor, and thus considered supplementary (entered as Block 2). In sum, the current analysis provides support for intolerance of uncertainty specific to eating and weight as a partial mediator of the relationship between shape and weight concerns and dietary restraint. The final model, applying all the significant standardised regression coefficients as path coefficients, is presented in Figure 3.2. For the overall model, $R^2 = .70$, $p < .001$.

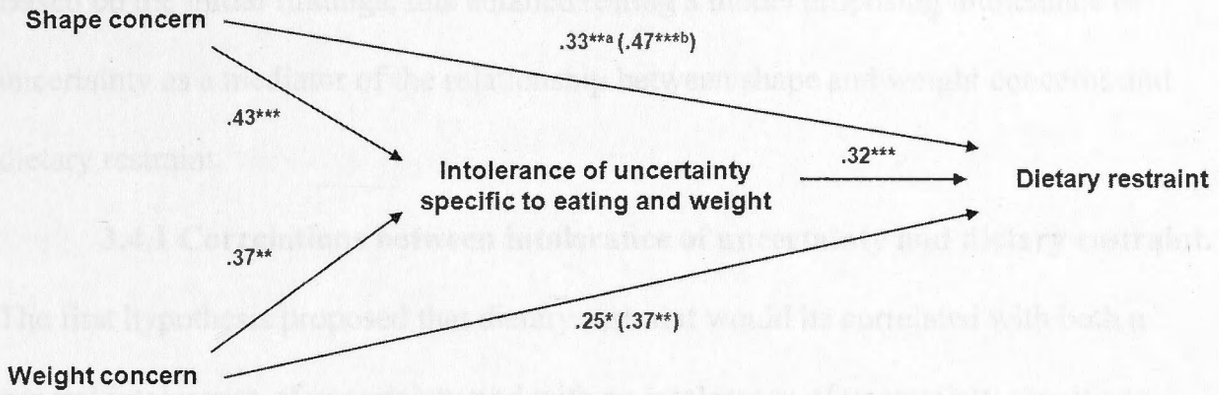

Figure 3.2. Path diagram of relationship between shape and weight concerns and dietary restraint, with intolerance of uncertainty specific to eating and weight serving as a mediator.

Note. Standardised regression coefficients are reported; shape concerns–dietary restraint indirect effect = .14*; weight concerns–dietary restraint indirect effect = .12*; $N = 164$.

[a] Direct effect

[b] Total effect

* $p < .05$, ** $p < .01$, *** $p < .001$

3.4 Discussion

The current study had four main goals. The first goal was to extend previous research by Konstantellou and Reynolds (2010) suggesting a link between intolerance of uncertainty and eating disorder symptoms by investigating the specific relationship between intolerance of uncertainty and dietary restraint utilising an Australian, community-based sample. The second goal was to extend the examination of this relationship by including an assessment of intolerance of uncertainty specific to eating and weight. The third goal sought to incorporate additional factors, recognised for their association with eating disorders, to determine whether intolerance of uncertainty could predict dietary restraint beyond inclusion of these factors in the prediction. Finally, if a relationship was established, the fourth goal was to begin exploration into the potential

mechanism through which intolerance of uncertainty may contribute to dietary restraint. Based on the initial findings, this entailed testing a model proposing intolerance of uncertainty as a mediator of the relationship between shape and weight concerns and dietary restraint.

3.4.1 Correlations between intolerance of uncertainty and dietary restraint. The first hypothesis proposed that dietary restraint would be correlated with both a general intolerance of uncertainty and with an intolerance of uncertainty specific to eating and weight. Correlation analyses were initially performed to explore the relationships between all relevant variables, and the hypothesis was partially supported. Eating- and weight-specific intolerance of uncertainty showed a significant, positive correlation with dietary restraint, however, general intolerance of uncertainty did not. The significant relationship between dietary restraint and intolerance of uncertainty specific to eating and weight is consistent with the qualitative descriptions of eating disorder patients in the first study of the current research project, who described a range of cognitions and behaviours consistent with an eating-specific intolerance of uncertainty, including the engagement of avoidant coping strategies (such as dietary restraint) in response to a negative appraisal of eating-related uncertainty. Eating disorder patients in the first study also described instances reflective of a more general intolerance of uncertainty and, although a significant correlation was not found between general intolerance of uncertainty and dietary restraint in the current study, general intolerance of uncertainty was able to explain a small proportion of variance in dietary restraint when entered as a predictor in a regression model, after controlling for body mass index.

The absence of covariation between general intolerance of uncertainty and dietary restraint is somewhat inconsistent with previous research by Konstantellou and Reynolds (2010), who found a significant, positive relationship between intolerance of

uncertainty and problematic eating attitudes. The decision to investigate dietary restraint in particular in the current study was based on the centrality of dietary restraint in eating disorder development and maintenance, and the hypothesised role of dietary restraint as a mechanism for coping with uncertainty. It is possible that general intolerance of uncertainty is not sufficiently powerful to affect change in eating disorder behaviour (i.e., dietary restraint), although it may have an influence on eating attitudes (as observed in the previous research; Konstantellou & Reynolds, 2010). The associations observed in the current study between general intolerance of uncertainty and attitudinal eating disorder features (including shape and weight concerns, and eating concerns) provides some support for this proposal, and adds to the evidence base linking intolerance of uncertainty and eating disorder symptoms more generally.

It is necessary, however, to comment on the measure employed to assess intolerance of uncertainty in general, that is, the Intolerance of Uncertainty Scale (IUS). While the measure has shown excellent internal consistency in earlier research (e.g., Buhr & Dugas, 2002; Freeston et al., 1994), multiple studies utilising large sample sizes have subsequently raised concerns about the complexity and instability of the structure underlying the measure, attributed to redundancy and a lack of relatedness between items (e.g., Carleton, Norton, & Asmundson, 2007; Norton, 2005). In the current study, the Cronbach's alpha coefficient suggested high internal consistency, however, on the basis of previous research, the interpretation of the IUS as an accurate reflection of the discrete construct of general intolerance of uncertainty remains tentative. In consideration of these concerns (and the comparatively stronger relationship between eating- and weight- specific intolerance of uncertainty and dietary restraint), the remaining hypotheses were assessed with consideration of the eating- and weight-specific intolerance of uncertainty measure only.

As indicated, intolerance of uncertainty specific to eating and weight showed a stronger relationship with dietary restraint – and eating disorder symptoms more generally – than that observed for general intolerance of uncertainty, which suggests a possible narrowing of intolerance of uncertainty into the domain of eating and weight for individuals with concurrent eating disorder symptoms. The content specificity of the intolerance of uncertainty construct has been debated in the literature (see section 1.4). The current findings may be due in part to the concerns raised regarding the validity of the IUS as a clear representation of intolerance of uncertainty (such that the degree of association between a general intolerance of uncertainty and dietary restraint was underestimated) and/or the findings may provide preliminary support for the hypothesis that an intolerance of uncertainty may present or develop into an intolerance of uncertainty in specific areas of concern for individuals – in this case, in the domain of eating, shape or weight. Further research, particularly utilising alternative measures of general intolerance of uncertainty, may clarify these possible interpretations.

3.4.2 Intolerance of uncertainty, dietary restraint, and associated variables. In accordance with the second hypothesis, intolerance of uncertainty specific to eating and weight was found to uniquely predict dietary restraint after controlling for other relevant constructs, namely perfectionism, self-esteem, and negative affect. Perfectionism, self-esteem, and negative affect have all shown links with eating disorder symptoms and it was therefore considered important to determine whether intolerance of uncertainty could uniquely add value to the prediction of dietary restraint with consideration of the aforementioned factors. The significant prediction of dietary restraint beyond the contribution of these constructs supports the hypothesised unique and notable role of intolerance of uncertainty in the context of eating disorder symptoms. It also extends previous research by providing support for a significant role of intolerance of uncertainty with respect to eating disorder behaviours, in addition to

attitudes. Moreover, the final model found intolerance of uncertainty specific to eating and weight to uniquely predict dietary restraint with comparable strength to shape and weight concerns. This finding underscores the importance of attending to the intolerance of uncertainty construct, given the acknowledgement of shape and weight concerns as highly relevant and instrumental in the eating disorders context (e.g., Fairburn, 2008; Fairburn et al., 2003; Killen et al., 1996; Killen, Taylor, et al., 1994). Indeed, Fairburn and colleagues (2003) have defined over-evaluation of shape and weight and their control as the "core psychopathology" (p. 510) of eating disorders.

The above findings hold a number of important implications. Perhaps most importantly, the findings suggest a potential benefit to the inclusion of a treatment component addressing intolerance of uncertainty specifically, since intolerance of uncertainty is unlikely to be wholly addressed by the treatment of related constructs. Secondly, the unique contribution of intolerance of uncertainty provides support for a hypothesis outlined previously in the literature, suggesting that intolerance of uncertainty may in fact be a fundamental component of anxiety, with the potential for a similar role in regards to eating disorder psychopathology (Carleton, Sharpe, & Asmundson, 2007; Konstantellou et al., 2011).

3.4.3 Intolerance of uncertainty as a mediator of shape and weight concerns and dietary restraint. The third and final hypothesis proposed that intolerance of uncertainty would mediate the relationship between shape and weight concerns and dietary restraint. Support was found for intolerance of uncertainty in the domain of eating and weight to act as a partial mediator between shape and weight concerns and dietary restraint.

High shape and weight concerns are regarded as strong predictors of dietary restraint, and a substantial body of research has supported this association (e.g., Gowers & Shore, 2001; Laessle, Tuschl, Kotthaus, & Pirke, 1989; Ross & Wade, 2004). The

mechanisms through which shape and weight concerns may lead to dietary restraint, however, may not yet be fully realised. The present findings suggest that intolerance of uncertainty may be one mechanism through which shape and weight concerns trigger dietary restraint. Explanation of this model requires consideration of both (a) the method through which shape and weight concerns may lead to intolerance of uncertainty in the domain of eating and weight, and (b) the method through which intolerance of uncertainty in the domain of eating and weight may subsequently lead to increased dietary restraint.

In regards to (a), individuals with high shape or weight concerns may be more vulnerable to developing a heightened intolerance of uncertainty in the domain of eating and weight, as such uncertainty may be perceived as particularly aversive by these individuals. As outlined in the introduction, uncertainty is likely to amplify a pre-existing emotional response to an event (Greco & Roger, 2003). Accordingly, since eating- and weight-related events are likely to be perceived as highly aversive by individuals with high shape or weight concerns, uncertainty in this domain is likely to be particularly intolerable. For example, for an individual with high weight concerns, uncertainty regarding the effect of a food or a possible change in weight may pose a threat to the attainment of valued outcomes (e.g., the thin ideal). While such uncertainty may arise for other individuals (e.g., the possibility of weight gain after food consumption), this is likely to be more tolerable, due to the lower concern regarding shape and weight.

In regards to (b), a resultant intolerance of uncertainty in the domain of eating and weight for individuals with high shape or weight concern is, in turn, predicted to lead to increased dietary restraint in an effort to reduce uncertainty and/or the corresponding negative affect. For example, an individual may attempt to avoid the uncertainty and corresponding distress associated with the consumption of a particular

food by employing dietary restraint and not consuming the food at all. Through such a mechanism, intolerance of uncertainty may serve to maintain eating disorder symptoms since the resulting behaviour (i.e., dietary restraint) is likely to be negatively reinforced due to a reduced perception of uncertainty and/or a reduction in the corresponding negative affect. With such behaviour reinforced, the dietary restraint may become perceived as a valuable source of certainty. This perception is consistent with reports by Schmidt and Treasure (2006) and Fairburn and colleagues (1998) suggesting that successful dietary restraint can produce a sense of mastery and control for individuals with an eating disorder. These benefits combined may lead to positive beliefs about the usefulness of self-starvation and an eating disorder more generally.

The findings of the current study support the hypothesised model, whereby intolerance of uncertainty specific to eating and weight was found to partially mediate the relationship between shape and weight concerns and dietary restraint, however this model cannot indicate the directional nature of these relationships. However, the interpretation offered here is consistent with the findings of the first study of the current research project, which suggested eating disorder behaviours (including dietary restraint) to be utilised frequently as a mechanism for coping with uncertainty in the domain of eating and weight. Nevertheless, it is possible that the observed relationships may be bi-directional. For example, dietary restraint may reinforce an intolerance of uncertainty specific to eating and weight through the relief obtained from the certainty associated with dietary restraint (which, in turn, reinforces the perception of uncertainty as negative). Alternatively, individuals who engage in dietary restraint, thereby avoiding uncertainty, may not receive the opportunity to test and obtain evidence of the non-catastrophic outcomes of allowing uncertainty. That is, these individuals may not learn that they can actually tolerate uncertainty, resulting in a continued perception of uncertainty as potentially catastrophic and intolerable. These hypotheses could be

investigated in future research. In addition, it is important to note that the proposed model does not discount a direct influence of shape and weight concerns on dietary restraint. Through the direct route, shape and weight concerns are likely to trigger dietary restraint, regardless of any uncertainty.

Negative affect appears to be a significant component of the operation of the mechanism described above, but was not found to be of significant influence in the current research. This may have been due to the fact that individuals who engage in dietary restraint may be successfully avoiding or minimising uncertainty, and thereby avoiding the associated negative affect. More detailed examination of an individual's precise response to uncertainty in an experimental setting may allow for observation of the progression from uncertainty recognition to negative affect to employment of a coping mechanism, such as avoidance through dietary restraint.

3.4.4 Theoretical and clinical implications. Several potentially important implications for the conceptualisation and treatment of eating disorder pathology may be drawn from the current study. Firstly, explicit consideration of intolerance of uncertainty is likely to be useful for gaining a greater understanding of the mechanisms through which variables contribute to eating disorder symptoms. Whilst dietary restraint is commonly considered to be employed in a direct effort to control shape and weight, a high intolerance of uncertainty may serve to intensify and reinforce this response. For an individual with a high intolerance of uncertainty, the possibility that consumed food may influence shape and weight – an uncertain possibility with an uncertain outcome – may prompt avoidance of this uncertainty via dietary restriction, reinforcing the perceived benefit of dietary restraint. Extreme dietary restraint thereby allows the individual to avoid significant uncertainty associated with eating (and, correspondingly, with shape and weight). Motivation for engaging in dietary restraint

(and other eating disorder behaviours) may therefore be more fully comprehended through consideration of intolerance of uncertainty.

Secondly, while the current study chose to examine dietary restraint as the outcome variable, it is reasonable to propose that a high intolerance of uncertainty may also predict – and potentially reinforce – other forms of avoidance, including other eating disorder behaviours (e.g., purging). This possibility may be worthy of consideration in formulating the maintenance cycle of eating disorder symptoms for a given individual.

A third implication of the current findings is that the results add further support to the potential utility of a treatment component addressing intolerance of uncertainty specifically in the area of eating and weight, since this shows a particularly strong relationship with dietary restraint, and eating disorder symptoms more generally. The findings also suggest the possibility of such a treatment component having utility for individuals with sub-clinical eating disorder symptoms. In addition to possibly influencing the maintenance of eating disorder symptoms, addressing intolerance of uncertainty may result in improved treatment outcomes given that such an intolerance may interfere with treatment engagement. Leite and Kuiper (2008) have speculated that a high intolerance of uncertainty could interfere with therapy because individuals may avoid becoming aware of problems or avoid evaluating the necessity for change due to the uncertainty involved in doing so. As acknowledged in the first study of the current research project, based on the tenuous motivation for change expressed by many patients with an eating disorder (Blake et al., 1997; Casasnovas et al., 2007; Martinez et al., 2007; Rieger et al., 2002; Vitousek et al., 1998), careful consideration of variables that may contribute to such hesitancy is undoubtedly warranted.

A fourth implication of the findings relates to understanding commonalities and differences in intolerance of uncertainty across disorders. The findings demonstrate

potential differences in the presentation of a high intolerance uncertainty for women with elevated eating disorder symptoms when compared with other populations who exhibit a high intolerance of uncertainty. For individuals presenting with eating disorder symptoms, dietary restraint and other eating disorder behaviours may be utilised as a primary mechanism for coping with uncertainty. This response is likely to be distinct from other populations who experience a high intolerance of uncertainty, for whom the prominent coping strategy or behavioural response may comprise other behaviours, such as worry (in generalised anxiety disorder; Dugas, Savard, et al., 2007), social avoidance (in social anxiety disorder; Carleton, Collimore, & Asmundson, 2010), or doubting compulsions (in obsessive compulsive disorder; Holaway et al., 2006). As suggested by Carleton, Sharpe, and Asmundson (2007), an individual's mechanism for coping with intolerance of uncertainty may indicate their specific clinical disorder – in this case, the use of dietary restraint may produce the clinical picture of an eating disorder – yet the underlying basis of intolerance of uncertainty is likely to be shared amongst anxiety disorders and, it is suspected, potentially eating disorders. In the first study of the current research project, although eating disorder behaviours (including dietary restraint) were identified as a coping response distinct from other populations, a number of other coping strategies did suggest overlap with the response of other populations reporting a high intolerance of uncertainty (e.g., rituals and checking behaviours in obsessive-compulsive disorder; Holaway et al., 2006; Tolin et al., 2003).

3.4.5 Strengths and limitations of the study and avenues for future research. The current study included a number of strengths. In contrast to the first study of the current research project, which obtained in-depth accounts of the experience of uncertainty for a small, clinical sample, this second study engaged a large-scale, community-based sample in order to examine general interrelationships between discrete variables. More specifically, the methodology of the current study afforded a

number of benefits, including (a) the acquisition of a more representative sample, (b) increased generalisability of the findings, and (c) facilitation of investigation across the spectrum of eating disorder symptoms. These features were considered fundamental to accomplishing the goals of the current study. The use of an online questionnaire also provided benefits with regard to respondent burden, ease of administration, and recruitment. These benefits may appear practical in nature, yet they are also likely to enhance the quality of the data through factors such as minimisation of participant fatigue, in-built mechanisms to prevent missing data, and the attainment a larger sample size.

In addition to the concerns already noted (e.g., regarding the validity of the Intolerance of Uncertainty Scale), a number of other methodological limitations must be considered in interpreting the findings. Firstly, the cross-sectional nature of the current study limits the ability to draw any conclusions regarding causality amongst the demonstrated relationships. While the purpose of this research was to examine covariation between intolerance of uncertainty and dietary restraint, an understanding of the causal nature of this relationship is highly desirable and suggested as a goal for future research. In order to investigate whether intolerance of uncertainty is indeed a trigger of dietary restraint, it would be beneficial for future research to employ an experimental methodology to investigate whether increasing or decreasing intolerance of uncertainty does indeed result in an intensification or reduction of dietary restraint or other eating disorder symtpoms. This consideration is applied in the design of the third study of the current research project. In response to the concerns raised regarding the validity of the IUS, the shortened version of the measure, the IUS-12, may be a more efficient and effective tool for future research. Carleton (2012) recently reported the IUS-12 to be a more robust measure of the core intolerance of uncertainty construct,

stating that several items included in the full IUS measure refer more specifically to generalised anxiety disorder symptoms, rather than intolerance of uncertainty itself.

Secondly, while the current research controlled for a number of potentially related constructs, it is likely that additional, extraneous variables also influence the relationships described. Two constructs that may be worthy of future investigation are rigidity and experiential avoidance. Rigidity has been linked with both intolerance of uncertainty and eating disorders, and has been acknowledged in eating disorder maintenance models (Ciarrochi, Said, & Deane, 2005; Schmidt & Treasure 2006; Tchanturia, Serpell, Troop, & Treasure, 2001). Although less research has been conducted, experiential avoidance is also hypothesised to relate to both intolerance of uncertainty and dietary restraint. Avoidant coping has been linked with eating disorders in multiple studies (e.g., Ghaderi & Scott, 2001; Mayhew & Edelmann, 1989; Troop et al., 1994) and, indeed, underscores the mechanism through which dietary restraint is speculated to appease an intolerance of uncertainty. From a theoretical viewpoint, an intolerance of uncertainty appears consistent with the experiential avoidance construct, given that individuals with a high intolerance of uncertainty typically avoid the perceived negative state of being uncertain. Future large-scale research incorporating an extensive battery of tests may be useful in identifying other variables relevant for inclusion in further assessment of intolerance of uncertainty in the eating disorder context.

Thirdly, the present study focused solely on the prediction of dietary restraint. As such, it would also be useful for future research to investigate other behaviours likely to be employed by individuals with eating disorders to reduce or avoid uncertainty, in addition to dietary restraint. Based on the findings of the first study of the current research project, relevant behaviours for investigation may include ritualistic behaviour (e.g., maintaining a set order in which food should be consumed), checking

behaviour (e.g., frequent weighing), and other avoidance behaviour (e.g., purging). Finally, replication of the results of the current study in a clinical sample is clearly warranted.

3.4.6 Conclusion. This study provides further support for a link between intolerance of uncertainty and eating disorder symptoms in the form of dietary restraint. Intolerance of uncertainty in the domain of eating and weight in particular showed a strong relationship with dietary restraint. Intolerance of uncertainty specific to eating and weight also explained variation in dietary restraint beyond the predictive contribution of perfectionism, self-esteem, and negative affect, and was comparable to that of shape and weight concerns which are deemed to be core factors in the maintenance of eating disorder symptoms. The current findings have contributed to the development of a provisional model specifying intolerance of uncertainty as a mechanism of influence in the relationship between shape and weight concerns and dietary restraint. The current study was cross-sectional, however, and experimental research is required to further substantiate the causal pathways of these relationships.

Chapter 4: Study Three - An Experimental Manipulation of Intolerance of Uncertainty in the Context of Eating Disorder Symptoms

4.1 Introduction

Intolerance of uncertainty has been identified as a construct worthy of consideration in regard to a range of clinical disorders, including generalised anxiety disorder, obsessive compulsive disorder, and, more recently, eating disorders. Several research studies have investigated intolerance of uncertainty as a causal contributor to the development and maintenance of problematic worry, however an examination of causal pathways between intolerance of uncertainty and eating disorders is yet to be conducted. Although research has initial provided support for the covariation of intolerance of uncertainty and eating disorder symptoms, there have been no studies examining causal relationships between the constructs through the use of experimental methodology. Indeed, across the spectrum of clinical disorders, only five studies are known to have directly manipulated intolerance of uncertainty. Despite this limited investigation, the importance of clarifying the relationship between intolerance of uncertainty and eating disorders has been acknowledged by several researchers (e.g., Konstantellou & Reynolds, 2010; Sternheim et al., 2011).

In response to this paucity of research, the current study aimed to experimentally manipulate intolerance of uncertainty to examine its contribution to eating disorder symptoms. More specifically, the manipulation sought to induce a high or low intolerance of uncertainty and compare participants' resultant responses to an instance of eating-related uncertainty. The investigated outcomes included negative affect, dieting intentions, body image anxiety, and checking behaviour. An experimental examination of intolerance of uncertainty in the context of eating disorder symptoms will offer insight into the potential role of intolerance of uncertainty as a causal

maintenance factor for eating disorder symptoms. A greater understanding of this role is likely to be valuable for guiding future research and, potentially, treatment.

The present study comprises the third and final component of the current research project. The first study of the research project employed a qualitative methodology in order to gain an in-depth understanding of the cognitions, affect, and behaviours associated with uncertainty for a sample of eating disorder patients. The findings suggested patients to perceive uncertainty as distinctly negative and to typically respond to uncertainty with a range of maladaptive coping strategies. The second study was quantitative and cross-sectional in design, and attended more specifically to the interrelationships of a range of constructs for women across the spectrum of eating disorder symptoms. Intolerance of uncertainty specific to eating and weight was proposed as a mediator of the relationship between shape and weight concerns and dietary restraint. However, the necessity of undertaking experimental research to investigate the causal direction of these associations was acknowledged. Thus the present study aimed to extend the research conducted in the first and second studies by testing a causal hypothesis for the observed relationship between intolerance of uncertainty and eating disorder symptoms.

The current research comprises the first known study to employ an experimental methodology to investigate intolerance of uncertainty as a possible causal maintenance factor for eating disorder symptoms. Stice (2002) defined this terminology, stating, "A factor that predicts symptom persistence over time versus remission among initially symptomatic individuals is a *maintenance factor*... If an experimental increase or decrease in a factor among initially symptomatic individuals results in symptom expression or suppression, respectively, it may be referred to as a *causal maintenance factor*" (p. 826). Furthermore, as outlined in the second study, three conditions considered necessary for establishing causation are covariation, temporal antecedence,

and non-spuriousness or the elimination of other causes (Garber & Hollon, 1991). Covariation between intolerance of uncertainty and eating disorder symptoms was demonstrated in the second study of the current research project and in a small number of previous studies (e.g., Konstantellou & Reynolds, 2010). An experimental manipulation can provide additional evidence pertaining to temporal antecedence and non-spuriousness. Experimental research is often considered as the principal method for investigating causality and, as noted by Rosen and colleagues (2007), manipulating intolerance of uncertainty is the most direct way to clarify causal relationships between intolerance of uncertainty and associated variables. Based on this rationale, intolerance of uncertainty was experimentally manipulated in the current study.

4.1.1 Proposed benefits of the current research. The current research is likely to yield a number of important benefits. Firstly, achieving a greater understanding of the maintenance of eating disorder symptoms is vitally important from a clinical treatment perspective. While an understanding of the development of eating disorders is essential and assists with prevention, treatment approaches have recognised the importance of focusing on factors which maintain the disorder, rather than factors which may have initially caused the disorder to develop. Shafran and de Silva (2003) suggest that cognitive-behavioural models focusing primarily on the maintenance of eating disorders are likely to be most useful in furthering treatment, noting, "It is the maintenance mechanisms that need to be reversed if the therapeutic intervention is to be effective" (p. 122). Furthermore, Stice (2002) identified maintenance factors as germane to the design of treatment interventions, as opposed to risk factors, which are important considerations in prevention programs. Based on these arguments, although intolerance of uncertainty may reasonably be investigated as a contributor to eating disorder development, the current research focus pertains to the role considered to be of

primary importance for informing treatment, namely, the role of intolerance of uncertainty as a maintenance factor for eating disorder symptoms.

Secondly, treatment development may be better informed by ascertaining the direction of influence in the observed relationship between intolerance of uncertainty and eating disorder symptoms. Research demonstrating a high intolerance of uncertainty to increase eating disorder symptoms would lend support to the development of a treatment component specifically targeting intolerance of uncertainty in the eating disorder context. Conversely, if this directional pathway was not found, it remains possible that eating disorder symptoms may instead prompt a heightened intolerance of uncertainty (an alternative explanation for the observed association between the constructs), in which case treatment development may be better focused on targeting core eating disorder symptoms. The presence of this latter pathway alone is considered unlikely based on extant theory, however empirical evidence is yet to be garnered to support causality in either direction. As such, research is required to clarify the directions of association.

4.1.2 Experimental manipulations of intolerance of uncertainty in previous research. Five previous studies have manipulated or attempted to manipulate the intolerance of uncertainty construct with the intention of examining its causal relationship with worry (Grenier & Ladouceur, 2004; Ladouceur, Gosselin, & Dugas, 2000; Meeten et al., 2012) and health monitoring and information seeking (Rosen & Knäuper, 2009; Rosen et al., 2007). In the first study, Ladouceur, Gosselin, and Dugas (2000) conducted an experiment involving a computerised roulette game, in which participants were instructed to win money. The researchers attempted to manipulate intolerance of uncertainty by altering the information provided to participants regarding the likelihood of winning. In the high intolerance of uncertainty condition, participants were informed that the chance of winning was exceptionally low. In the low intolerance

of uncertainty condition, the chance of winning was stated to be exceptionally high. The objective probability of winning was equal across groups. The high intolerance of uncertainty group was found to exhibit higher levels of worry following the induction. However, while Ladouceur, Gosselin, and Dugas claimed that intolerance of uncertainty was experimentally manipulated, it has been argued that it was simply uncertainty itself (or the perceived degree of uncertainty) that was experimentally increased or decreased by stating the odds to be relatively poor or good (Harvey, Watkins, Mansell, & Shafran, 2004). As such, this study is not considered to have directly manipulated intolerance of uncertainty.

In subsequent research, Grenier and Ladouceur (2004) manipulated intolerance of uncertainty through a different paradigm, whereby participants were asked to imagine having ingested a medicine and then repeating statements reflecting high or low intolerance of uncertainty (e.g., "It's unfair to have no guarantees in life", or "I am able to live with the uncertainties in life"). Participants in the high intolerance of uncertainty condition were found to report a significantly increased level of state worry following the manipulation, suggestive of a causal role of intolerance of uncertainty in the maintenance of problematic worry.

In a more recent study, Meeten and colleagues (2012) manipulated intolerance of uncertainty using another procedure, whereby participants read stories in which the character had either a high or low intolerance of uncertainty and encountered several uncertain situations. Participants were then asked to think of and describe a situation in their own life in which they felt uncertain of the outcome. Following this, participants were asked to imagine they were the character from their story and write about their expected thoughts and feelings in response to their real-life uncertain scenario. The manipulation was deemed successful based on a manipulation check indicating that participants in the high intolerance of uncertainty condition showed a significantly

higher mean score on a composite measure of intolerance of uncertainty than participants in the low intolerance of uncertainty condition (Meeten et al., 2012). Participants in the high intolerance of uncertainty condition were found to generate more catastrophic worry than participants in the low intolerance of uncertainty condition.

Finally, Rosen and colleagues (2007) manipulated intolerance of uncertainty to examine the effect on health behaviours through a different paradigm, which was replicated and extended in the current study and described in detail below. Rosen and colleagues (2007) found that experimentally increasing intolerance of uncertainty led to increased health monitoring behaviour. Rosen and Knäuper (2009) again employed a similar manipulation in conjunction with a manipulation of situational uncertainty to assess the impact on worry and information seeking in the health psychology context. Rosen and Knäuper found individuals in the high intolerance of uncertainty and high situational uncertainty condition to show elevated information seeking and worry when compared with participants in the low intolerance of uncertainty and low situational uncertainty condition.

4.1.3 Modifications of previous experimental manipulations of intolerance of uncertainty. The experimental manipulation employed in the current study was informed by prior theory and research, and consisted of three components. The procedure replicated and extended the methodology employed in the study by Rosen and colleagues (2007), which manipulated intolerance of uncertainty for the purpose of examining its effect on health monitoring behaviours. In order to manipulate intolerance of uncertainty, Rosen and colleagues employed a linguistic manipulation in conjunction with false feedback. Both the linguistic manipulation and the false feedback were incorporated in the current procedure, with minor adjustments made to the wording of the questionnaire items and the feedback provided. These methods

formed the initial two components of the current manipulation. The third and final component was developed on the basis of dissonance theory (see Festinger, 1957; Leippe & Eisenstadt, 1994) and previous research by Stice and colleagues (see Stice, Mazotti, et al., 2000; Stice, Shaw, Becker, & Rohde, 2008) and was designed to reinforce the first and second components of the manipulation.

The first component of the current procedure entailed the linguistic manipulation of the Intolerance of Uncertainty Scale (IUS; Buhr & Dugas, 2002) and was based on a procedure originally developed by Salancik and Conway (1975) and later modified by Rosen and colleagues (2007). The manipulation involves adjusting item wording in a questionnaire to influence the likelihood of item endorsement, prompting a subsequent effect on the inferences made regarding one's own attitudes. That is, the resulting degree of item endorsement is expected to then influence the participant's self-perceptions regarding the construct being examined. The rationale for the linguistic manipulation is based on several assumptions. Firstly, Salancik and Conway (1975) assumed that manipulating item wording on a questionnaire would affect item endorsement. In their study, Salancik and Conway (1975) paired items with the words *on occasion* or *frequently* in order to increase or decrease the likelihood of endorsement on a measure of religious attitudes. Similarly, Rosen and colleagues (2007) adjusted items of the IUS to include the specifiers *occasionally* or *almost always*, with the expectation of prompting higher and lower item endorsement, respectively. In both studies, the effect was observed in line with expectations, in that significantly higher item endorsement was found in questionnaires administered with the *on occasion* or *occasionally* specifiers, compared to questionnaires administered with the *frequently* or *almost always* specifiers. As a second assumption, Salancik and Conway proposed that individuals will generate cognitions in support of their relatively high or low

endorsement of the construct being assessed. That is, cognitions will be created to support one's positive or negative responses to statements in the questionnaire.

In combination, these arguments suggest that an individual's cognitions may be manipulated by influencing the endorsement of particular statements, which is further expected to influence inferences made regarding one's attitudes or behaviour. That is, the cognitions generated in support of one's endorsement are expected to be used by the individual to derive a judgement about his or her own attitudes or behaviour (Salancik & Conway, 1975). This argument is consistent with Bem's (1972) self-perception theory, which proposes that, "Individuals come to 'know' their own attitudes ... partially by inferring them from observations of their own overt behaviour" (p. 2). In the current study, therefore, influencing item endorsement on a measure of intolerance of uncertainty was expected to affect the cognitions generated by participants regarding their intolerance of uncertainty and correspondingly influence their self-perception of their own intolerance of uncertainty.

The second component of the current procedure consisted of the provision of false feedback regarding the participant's tolerance of uncertainty, which was expected to further alter self-perception. This has been shown to occur in numerous previous studies that have utilised false feedback to effectively manipulate various perceptions, such as perceived open-mindedness (Petty & Brock, 1979), perceived self-esteem (Rector & Roger, 1997), and perceived academic control (Perry, 2003). Furthermore, the linguistic manipulation in conjunction with false feedback has been shown to alter self-perception in the previous research manipulating intolerance of uncertainty (Rosen et al., 2007) and in other research (e.g., manipulating the perception of oneself as a successful or unsuccessful dieter; Polivy & Herman, 1991).

The current study sought to further strengthen the manipulation by incorporating a third component, designed to reinforce the induced self-perception. This component

was based on dissonance theory (Festinger, 1957; Leippe & Eisenstadt, 1994) and prior applications of dissonance-based interventions in the eating disorder context (e.g., Stice, Mazotti, et al., 2000; Stice, Rohde, Gau, & Shaw, 2009; Stice, Shaw, Burton, & Wade, 2006). In the manipulation employed in the current study, participants were requested to write a paragraph from the perspective outlined in their false feedback. For example, individuals who receive feedback indicating that they are intolerant of uncertainty were then informed, "We would like you to write a paragraph from your own perspective regarding the benefits of certainty and the advantages gained by not tolerating uncertainty." Completion of this task was expected to reinforce the induced self-perception, based on the drive to maintain consistency between their attitudes and behaviour which, in this instance, consisted of writing an argument in support of either a high or low intolerance of uncertainty. This expectation is consistent with Bem's (1972) self-perception theory and was also based on dissonance theory. According to dissonance theory, the possession of inconsistent cognitions produces psychological discomfort, which motivates people to modify their cognitions to restore consistency (Festinger, 1957). Experiments have found that if participants are encouraged to take a counter-attitudinal stance, cognitive dissonance occurs and leads people to adjust their attitudes to reduce the perceived inconsistency between the original and induced attitude. For example, in an experiment by Leippe and Eisenstadt (1994), Caucasian college students were asked to write an essay publicly endorsing a controversial proposal to double funding at their university for scholarships for African American students (and correspondingly reduce the funding available to Caucasian students). Following completion of the task in which participants were required to write an essay endorsing the policy, under the impression that their essay was identifiable or "highly public", the general attitude of participants toward African Americans became more

favourable. Individuals have also been shown to change their behaviour in order to reduce such dissonance (Dickerson, Thibodeau, Aronson, & Miller, 1992).

In the context of eating disorders, dissonance-based interventions conducted by Stice and colleagues (e.g., Stice, Mazotti, et al., 2000; Stice et al., 2009; Stice et al., 2006) have been found to reduce endorsement of the thin-ideal. Stice and colleagues focused on reducing thin-ideal internalisation since it is an established risk factor for future bulimic symptoms (Stice, 2002). In a randomised efficacy trial, adolescent girls with body dissatisfaction assigned to a prevention program comprising dissonance-inducing activities were found to show significantly greater reductions in eating disorder risk factors and bulimic symptoms than similar participants assigned to a healthy weight management program, an expressive writing control condition, and an assessment-only control condition (Stice et al., 2006). Stice, Shaw, and colleagues (2008) report dissonance-based interventions to have received sufficient empirical support to be termed efficacious, according to the guidelines set by the American Psychological Association (1995).

The interventions by Stice and colleagues are typically conceptualised as dissonance-based because the activities were designed to be counter-attitudinal for individuals who have internalised the thin-ideal (Stice et al., 2006). However, while many interventions were conducted with individuals expected to have a pre-existing, counter-attitudinal stance to that being induced (e.g., Stice et al., 2009), trials have also shown the dissonance intervention to produce effects for general populations (e.g., Becker, Smith, & Ciao, 2006), which supports the use of this methodology in the current study, since the full sample of participants is unlikely to hold a counter-attitudinal stance to that which is induced. Indeed, for participants who already maintain the induced attitude, the attitude is likely to simply be maintained, or possibly

strengthened. Regardless, research suggests that the likely effect of expressing support for a given attitude is consistent with the purpose of the current manipulation.

In the current study, an active-engagement task was utilised (i.e., requesting the construction of an argument), rather than simply providing information to participants outlining the benefits of a tolerance or intolerance of uncertainty, since active engagement material has been found to be more effective in producing attitude change than the didactic presentation of psychoeducational material (Stice & Shaw, 2004). Stice, Marti, Spoor, Presnell, and Shaw (2008) also note that increasing the degree of effort, accountability, and the perception of voluntary participation may further strengthen the effects. This is consistent with Festinger's (1957) view that the effect is likely to be maximised when the individual perceives the new attitude to be voluntary, since the inconsistency may otherwise be attributed to the demands of the situation. The current research sought to consider these variables by (a) requesting a written paragraph, which requires at least a moderate degree of effort, (b) stating that the results would be used to inform an educational program for other students, thereby intimating a degree of responsibility, and (c) phrasing the task to create the illusion of writing an argument from the participant's own perspective. This latter point was achieved by framing the request as prompted by the participant's "existing" tolerance of uncertainty, that is, as indicated by their (manipulated) item endorsement on the IUS and corresponding (false) feedback. In sum, the combination of the linguistic manipulation on the IUS, false feedback, and a written response in line with the induced perspective is expected to result in a stronger and/or more valid manipulation of intolerance of uncertainty than has occurred in previous research.

Several factors required additional consideration in the development of an intolerance of uncertainty manipulation for the purpose of investigating eating disorder symptoms. As discussed in the second study of the current research project, there is

debate as to the relative content specificity of the intolerance of uncertainty construct (see section 1.4). While the second study provided preliminary support for a potential narrowing of the construct into a domain of pre-existing concern for an individual (i.e., into the domain of eating, shape, and weight for individuals with shape and weight concerns), it remains possible that a general intolerance of uncertainty could be relevant for eating disorder pathology. Indeed, in the first study of the current research project, eating disorder patients described both eating- and non-eating-related uncertainty as highly distressing (see Chapter 2). Since this debate remains unresolved, the current study aimed to continue the appraisal of intolerance of uncertainty as a potentially broad construct, and consequently sought to manipulate the general intolerance of uncertainty construct. Manipulation of the general construct was also considered most appropriate for the current research since a specific intolerance of uncertainty is only expected to arise in an area of pre-existing concern for an individual. Attempting to experimentally increase intolerance of uncertainty in the domain of eating, shape, and weight is likely to be less effective with a community-based sample that will include many individuals for whom this is not an area of concern.

A further factor for consideration involves the conceptualisation of intolerance of uncertainty for the purpose of the manipulation. The Intolerance of Uncertainty Scale (IUS; Buhr & Dugas, 2002) was the measure chosen to create the linguistic manipulation in the current study. Although previous concerns have been raised regarding the factor structure of the IUS (see section 1.6), and the second study of the current research project raised further questions regarding the coherence of the measure as a whole, the IUS was considered to be the most viable measure for the purposes required in the current manipulation. Since the measure was used as part of the manipulation itself, the measure was not interpreted as an accurate reflection of a participant's tolerance of uncertainty. Furthermore, the IUS was utilised in previous

research manipulating intolerance of uncertainty by Rosen and colleagues (2007), which formed the basis of the current manipulation. Rosen and colleagues successfully manipulated intolerance of uncertainty using this measure as part of their procedure and, as such, it was considered suitable for the purpose of the current research.

4.1.4 Proposed model of intolerance of uncertainty in the eating disorders context. In the second study of the current research project, intolerance of uncertainty specific to eating and weight was suggested as a potential mediator of the relationship between shape and weight concerns and dietary restraint. The model proposed that high shape and weight concerns may amplify an intolerance of uncertainty specific to eating, shape, and weight (and heighten the associated negative affect), leading to increased dietary restraint in an effort to reduce the uncertainty or associated affect. Dietary restraint was further postulated to potentially reinforce an intolerance of uncertainty, thereby creating a maintenance cycle of eating disorder symptoms. Although the study found intolerance of uncertainty specific to eating, shape, and weight to show a stronger relationship with eating disorder symptoms than intolerance of uncertainty in general, it was considered premature to dismiss the general intolerance of uncertainty construct altogether. Rather, in order to comprehensively assess the potential role of a general intolerance of uncertainty, the current study chose to manipulate general intolerance of uncertainty in order to examine whether the broader construct may play a role in the eating disorder context.

Shape/weight overvaluation was also included as an independent variable in the current study. The term *shape/weight overvaluation* is used to refer to the "undue influence of body weight or shape on self-evaluation" (APA, 2000, p. 589). It is diagnostically similar and may even be viewed as the same construct as overconcern with shape and weight (see Goldfein, Walsh, & Midlarsky, 2000), which forms part of standard international diagnostic criteria for anorexia nervosa and bulimia nervosa

(*DSM-IV-TR*; APA, 2000). Shape/weight overvaluation was incorporated in the current research to allow for the examination of a possible interaction with intolerance of uncertainty in producing the hypothesised outcomes. As discussed in the second study, shape and weight concerns (a key component of which is shape/weight overvaluation) form an instrumental component of eating disorders and their role in the maintenance of eating disorder symptoms and in the specific prediction of dietary restraint has been widely acknowledged (Fairburn, 2008; Fairburn et al., 2003; Gowers & Shore, 2001; Laessle et al., 1989; Ross & Wade, 2004). The second study further outlined previous research supporting the possibility of a link between high shape and weight concerns and a general intolerance of uncertainty, based on a shared relationship with difficulty tolerating emotions (see Chapter 3).

4.1.5 Aims and hypotheses of the present study. The aim of this study was to investigate whether experimentally manipulating intolerance of uncertainty impacts negative affect, dieting intentions, weight-related body image anxiety, and checking behaviour (i.e., the likelihood of seeking nutritional information) in the context of eating-related uncertainty. A 2 x 2 between-groups design was employed with a measured independent variable (high or low shape/weight overvaluation) and random allocation to one of two experimental conditions (high or low intolerance of uncertainty).

The following hypotheses were derived on the basis of previous theoretical and empirical work:

1. Participants in the high intolerance of uncertainty condition would experience significantly higher negative affect, dieting intentions, body image anxiety, and eating-related checking behaviour (i.e., seeking nutritional information) in response to the request to consume food with an uncertain composition than participants in the low intolerance of uncertainty condition.

2. Participants with higher levels of shape/weight overvaluation would experience significantly higher negative affect, dieting intentions, body image anxiety, and eating-related checking behaviour than participants with lower levels of shape/weight overvaluation.
3. There would be a significant interaction between intolerance of uncertainty and shape/weight overvaluation such that participants in the high intolerance of uncertainty condition with higher levels of shape/weight overvaluation would experience the highest negative affect, dieting intentions, body image anxiety, and eating-related checking behaviour relative to the other conditions.

4.2 Method

4.2.1 Participants.

4.2.1.1 Overview of the sample. A sample of adult women from the Australian community was recruited to participate in the current study. Participants were recruited via online advertisements, word-of-mouth, and flyers posted at a university campus. Participants were offered $10 remuneration for their time. University undergraduate students undertaking first year psychology were given the option of course credit as an alternative form of remuneration if preferred. After the exclusion of data for 12 participants due to a possible eating disorder or elevated anxiety, the sample consisted of 91 participants. After the further exclusion of 19 participants for whom the manipulation was deemed unsuccessful, the final sample consisted of 72 women.

4.2.1.2 Gender. All participants in the current research were women, due to this criterion being set for the reasons outlined in the methodology for the first and second studies of the current research program.

4.2.1.3 Age. The age criterion for the current research restricted participation to individuals aged between (and including) 18 to 30 years. The rationale for this criterion is outlined in the methodology for study two. The age of the final sample ranged

between 18 and 30 years, with a mean age of 19.88 years (SD = 2.0). Figure 4.1 displays the distribution of participants by age.

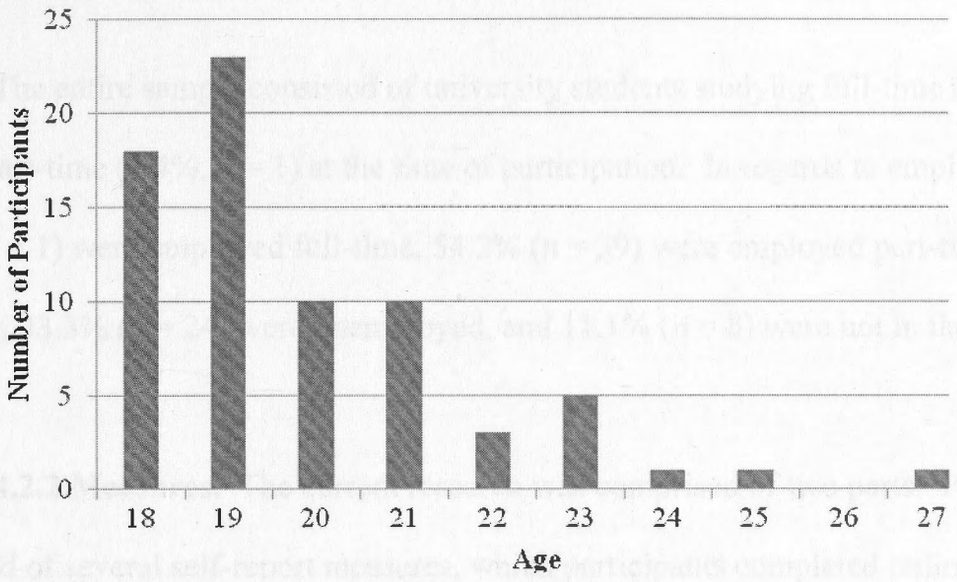

Figure 4.1. Distribution of participants by age (study three).

4.2.1.4 Region of birth. Approximately half of the sample was born in Australia (48.6%, n = 35), 30 (41.7%) born in Asia, 4 (5.6%) in Europe, 2 (2.8%) in Africa, and 1 (1.4%) in South America. For participants born outside of Australia, the mean length of time living in Australia was 3.82 years (range: 1 month to 16.0 years). The data (i.e., country of birth and length of time living in Australia) therefore suggest that English was not the first language for a subset of participants.

4.2.1.5 Living arrangements. A significant proportion (n = 31, 43.1%) of the sample were living with parents and/or other family members at the time of the study, 20.8% (n = 15) lived with friends or housemates, 2.8% (n = 2) lived with their partner, 23.6% (n = 17) lived alone, and 9.7% (n = 7) lived in a university residence.

4.2.1.6 Educational attainment and employment. Participants indicated their highest level of completed education and current educational status. In regards to highest level of education, 1.4% (n = 1) cited a Master's degree, 1.4% (n = 1) cited

Honours, 2.8% (n = 2) cited a Bachelor's degree, 9.7% (n = 7) cited a diploma or advanced diploma, 5.6% (n = 4) cited a trade or apprenticeship, and 76.4% (n = 55) cited Year 12. A small number of participants (2.8%, n = 2) specified 'Other' (e.g., A-levels).

The entire sample consisted of university students studying full-time (98.6%, n = 71) or part-time (1.4%, n = 1) at the time of participation. In regards to employment, 1.4% (n = 1) were employed full-time, 54.2% (n = 39) were employed part-time or casually, 33.3% (n = 24) were unemployed, and 11.1% (n = 8) were not in the labour force.

4.2.2 Measures. The current research was comprised of two parts. Part A consisted of several self-report measures, which participants completed online. Part B consisted of demographic and background questions and self-report measures compiled into a single package, which participants completed on a computer in an ANU laboratory. The relevant measures are summarised in Tables 4.1 and 4.2 and included in Appendix I. A description of the psychometric properties and nature of each measure is provided below.

Table 4.1

Summary of Part A Self-Report Measures

Measure	**Authors (Year Published)**	**Inclusions**
Patient Health Questionnaire (PHQ)	Spitzer, Kroenke, and Williams (1999)	Eating, anxiety, and alcohol modules, height and weight
Intolerance of Uncertainty Scale - Short Form (IUS-12)	Carleton, Norton, and Asmundson (2007)	All items included
NEO Five Factor Inventory (NEO-FFI)	Costa and McCrae (1992)	Initial 30 items included to disguise the IUS-12
'Life Domains' (including two items from the Eating Disorder Examination-Questionnaire; EDE-Q)	EDE-Q items: Fairburn and Beglin (1994) Remaining items: created for the current study	Two EDE-Q items drawn from the Shape Concern and Weight Concern subscales; and five similarly-worded items created to disguise the purpose of the measure

Table 4.2

Summary of Part B Self-Report Measures

Measure	**Authors (Year Published)**	**Subscales**
Demographic questions	Created for the current study	None
Intolerance of Uncertainty Scale (IUS) – adapted for experimental manipulation	Buhr and Dugas (2002)	None
Positive and Negative Affect Schedule (PANAS)	Watson, Clark, and Tellegen (1988)	Positive Affect, Negative Affect
Dieting Intentions Scale (DIS)	Cruwys, Platow, Rieger, and Byrne (2012)	None
Physical Appearance State and Trait Anxiety Scale (PASTAS)	Reed, Thompson, Brannick, and Sacco (1991)	Weight, Non-Weight

4.2.2.1 Patient Health Questionnaire (PHQ). The PHQ was developed by Spitzer and colleagues (1999) and is designed to facilitate recognition and diagnosis of clinical disorders. Given that the measure relies on self-report, the PHQ is considered most usefully applied as a screening tool (Spitzer et al., 1999), and this was the function of the measure in the current study. The PHQ has shown good criterion and construct validity, demonstrated through consistency between the PHQ and independent interviews conducted by mental health professionals, indices of functional impairment, and indices of health care use (Spitzer et al., 1999). Spitzer and colleagues (1999) also found the PHQ to retain diagnostic validity comparable to the clinician-administered PRIME-MD developed by Spitzer and colleagues in 1994.

The full PHQ assesses a wide range of clinical disorders, however only three modules were included in the current study, namely, the items pertaining to eating (designed to assess for bulimia nervosa and binge eating disorder), anxiety (designed to assess for "panic syndrome" or "other anxiety syndrome"), and alcohol (designed to assess for alcohol abuse). As part of this assessment, participants were also asked to provide their height and weight in order to calculate body mass index (BMI = kg/m^2) to assist in the screening for anorexia nervosa. The eating- and anxiety-related items were used to screen for an eating disorder or elevated anxiety. The alcohol-related items were included solely to disguise the purpose of the measure (i.e., to avoid inducing a high sensitivity to eating-related concerns during the remainder of the study). Spitzer and colleagues (1999) commented on the benefit of employing a computer program to ensure correct application of the scoring algorithm. This was employed for the current study. Participants who produced scores suggestive of elevated anxiety or an eating disorder were automatically assigned to the low intolerance of uncertainty condition for Part B and their data was excluded from the analyses (n = 12). Automatic assignment to the low intolerance of uncertainty condition was undertaken due to ethical

considerations, such that potentially vulnerable participants were assigned to the condition aiming to induce an increased tolerance for uncertainty (expected to be less distressing), rather than inducing an increased intolerance for uncertainty.

4.2.2.2 Intolerance of Uncertainty Scale – Short Form (IUS-12). The IUS-12 was developed by Carleton, Norton, and Asmundson (2007) as a 12-item short-form of the original 27-item Intolerance of Uncertainty Scale (IUS; Freeston et al., 1994 [French version]; Buhr & Dugas, 2002 [English version]). It is designed to measure reactions to uncertainty, and was included in the present study to provide a measure of pre-existing differences in intolerance of uncertainty across the experimental conditions. The development of a shortened version of the IUS was prompted by theoretical arguments and research findings indicating the full IUS to possess an instable factor structure (Carleton, Norton, & Asmundson, 2007; Norton, 2005). The psychometric properties of the IUS-12 were investigated using two undergraduate student samples, with results indicating good convergent validity and high internal consistency (.91; Carleton, Norton, & Asmundson, 2007). The IUS-12 is strongly correlated with the original, 27-item measure (r = .96; Carleton, Norton, & Asmundson, 2007). For information regarding the psychometric properties of the full version of the IUS, please refer to section 3.2.2.2. In the current study, the Cronbach's alpha coefficient for the IUS-12 was .88.

4.2.2.3 NEO Five Factor Inventory (NEO-FFI). The first 30 items of the NEO-FFI (Costa & McCrae, 1992) were incorporated as a filler to disguise the purpose of the IUS-12. Since this was the sole purpose of this measure and the results of the NEO-FFI scores were therefore not analysed, the psychometric properties of this measure are not reported here.

4.2.2.4 'Life Domains'. The 'Life Domains' measure was developed for the purpose of the current study and included seven items assessing the influence of various

life domains on self-evaluation using a 7-point, forced-choice rating scheme. Two items were drawn from the Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994) and assessed shape and weight overvaluation through the following questions respectively: "Over the past 28 days ... has your shape influenced how you think about (judge) yourself as a person?" and "Over the past 28 days ... has your weight (number on the scale) influenced how you think about (judge) yourself as a person?" The remaining items of the EDE-Q were not administered to minimise respondent burden and participant awareness of the true focus of the study. A composite shape/weight overvaluation score based on these two items of the EDE-Q has been utilised in previous studies (e.g., Grilo et al., 2008; Hrabosky, Masheb, White, & Grilo, 2007; Mond, Hay, Rodgers, & Owen, 2007), and research has supported the use of these items as a valid measure of the overvaluation criterion applied in eating disorder diagnoses (Goldfein et al., 2000). Five similarly-worded items were created and included solely to disguise the purpose of the measure and, as such, were not analysed.

4.2.2.5 Demographic questions. Information pertaining to the participant's age, current living arrangement, and educational background was collected.

4.2.2.6 Intolerance of Uncertainty Scale (IUS). The IUS (Buhr & Dugas, 2002) is a 27-item self-report measure, which assesses multiple aspects of intolerance of uncertainty, including the belief that uncertainty is stressful, uncertain events should be avoided, and uncertainty leads to the inability to act. For information regarding the psychometric properties of the IUS, please refer to section 3.2.2.2. In the standard IUS, respondents rate the degree to which items apply to them on a 5-point Likert scale, ranging from 1 (*not at all characteristic of me*) to 5 (*entirely characteristic of me*). In the current study, however, the IUS items and response scale were adapted for the purpose of the experimental manipulation. The item wording was adjusted

differentially for the high and low intolerance of uncertainty conditions to include the specifiers *occasionally* or *almost always* respectively. In addition, the response scale was reduced to a *True* or *False* format.

4.2.2.7 Positive Affect and Negative Affect Scale (PANAS). The PANAS is a 20-item self-report measure developed by Watson and colleagues (1988) and designed to assess the two primary dimensions of mood, namely, positive and negative affect. The measure was developed with a sample of undergraduate students and validated with adult populations (Crawford & Henry, 2004; Watson et al., 1988). Excellent convergent and discriminant validity have been shown through demonstration of the expected correlations with lengthier measures of each mood dimension and measures of related constructs (e.g., the Negative Affect scale correlated positively with measures of depression, perceived stress, and state anxiety, whereas the Positive Affect scale showed negative correlations with these measures; Watson et al., 1988). The construct validity of the subscales as developed by Watson and colleagues (1988) has also been supported by confirmatory factor analysis (Crawford & Henry, 2004).

The PANAS can be applied with various time frames in order to assess either state mood fluctuations or underlying trait affect (see Watson et al., 1988). In the current study, a present moment time frame was applied. When implemented with the present moment time frame instructions, the PANAS has been found to be sensitive to changes in internal or external circumstances (Watson et al., 1988). This supports the specified purpose of inclusion in the current study, which is to assess temporary mood change as a result of the experimental manipulation. In the version used in the current study, participants rate the extent to which they are experiencing various emotional states in the present moment on a scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). The measure has shown good internal consistency when applied with the present moment time instruction (.85-.89; Watson et al., 1988). In the current study, the

Cronbach's alpha coefficient was .86 for the Positive Affect subscale and .80 for the Negative Affect subscale. Only the Negative Affect scale scores were analysed in order to provide an index of current negative mood.

4.2.2.8 Dieting Intentions Scale (DIS). The DIS (Cruwys et al., 2012) is a recently developed measure, designed to predict future dieting or behavioural efforts to lose weight. It is considered to be particularly useful in assessing an individual's intention to diet in the immediate future (Cruwys et al., 2012), which was the precise purpose for inclusion in the current study. Due to the recent development of the DIS, only initial assessments of the psychometric properties of the instrument have been conducted. The findings suggest the DIS to have predictive utility for dieting behaviours, with convergent and discriminant validity evidence shown with constructs theorised to be related (e.g., state body satisfaction) and distinct (e.g., trait self-esteem), respectively (Cruwys et al., 2012). Internal consistency was above .91 in each of the validation samples. In the current study, the Cronbach's alpha coefficient was .94.

4.2.2.9 Physical Appearance State and Trait Anxiety Scale (PASTAS). The PASTAS is an 18-item self-report measure developed by Reed and colleagues (1991) and designed to assess body image anxiety, with both trait and state versions are available. The current study utilised the state version of the PASTAS since the purpose of inclusion was to assess situationally-induced body image anxiety in response to the experimental manipulation. Indeed, the state measure has been suggested as particularly useful for assessing the effect of an experimental manipulation (Reed et al., 1991). In the state version, participants rate how anxious, tense, or nervous they feel *right now* with regard to their body and specific parts of their body on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*exceptionally*). Convergent validity has also been shown through correlations with measures of body dissatisfaction and eating disturbance (Reed et al., 1991). In addition, a principal components analysis of the

scale revealed two components, labelled "Weight" (e.g., thighs, waist) and "Non-Weight" (e.g., ears, lips). High internal consistency was also reported (.82-.92; Reed et al., 1991). Comparable internal consistency has also been observed in other research (e.g., .91; Orr & Moscovitch, 2013). In the current study, only the Weight scale was utilised as the induction of eating-related uncertainty in the experimental paradigm was expected to prompt weight-related anxiety (due to the uncertain effect of food consumption on body weight), but was not expected to induce anxiety about body parts unrelated to weight (e.g., anxiety about one's nose). The Cronbach's alpha coefficient was .91 for the Weight scale in the present sample.

4.2.2.10 Behavioural measure of information seeking. In order to supplement the use of attitudinal measures, a behavioural measure was also administered given the well-established discrepancy that can exist between attitudes and behaviours (Ajzen, Brown, & Carvajal, 2004; Ajzen & Fishbein, 2005; Sheeran, 2002; Wicker, 1969). In the present study, the behaviour measured was a form of checking, that is, whether or not participants sought information on the nutritional content of a snack they expected to consume by clicking on a web link. This behaviour was selected as a dependent variable given that checking behaviour has been strongly linked with elevated intolerance of uncertainty and postulated to occur as an attempt to reduce uncertainty and associated distress (Holaway et al., 2006; Lind & Boschen, 2009; Overton & Menzies, 2005; Tolin et al., 2003).

4.2.3 Procedure.

4.2.3.1 Overview. Approval to conduct this study was obtained from the Australian National University Human Research Ethics Committee (see Appendix J for copies of approval to conduct the research, the Information Sheet, Consent Form, and Debrief Sheet). As indicated above, the study consisted of two parts, denoted as *Part A* and *Part B*. Part A consisted of a questionnaire made available online, accessible via a

direct link provided to participants. Part A was completed by the participant on a computer of their choice (e.g., at home). Informed consent was obtained from each participant. Following completion of Part A, participants were requested to contact the primary researcher to arrange a time to complete Part B of the study. Participants completed Part B approximately one week after completion of Part A. Participants were required to physically attend the university to complete Part B at a designated laboratory so as to ensure compliance with the experimental manipulation and given that the study ostensibly involved an eating task.

4.2.3.2 Recruitment and debriefing of the sample. Participants were invited to participate via flyers posted around the university campus, and word-of-mouth (see Appendix K). Participants were informed that the purpose of the study was to investigate "thinking, mood, and body image". The precise nature of the study was withheld due to the nature of the experimental manipulation. Individuals were not pressured to participate in any way and were able to withdraw at any time. All participants were debriefed following the experiment. The final page of the Part B questionnaire provided a list of support services and the contact details of the researchers and ethics committee for any questions or concerns following participation.

4.2.3.3 Questionnaire development. The questionnaires for both Part A and B were developed through the Qualtrics website (www.qualtrics.com). Qualtrics has Statement on Auditing Standards (SAS) Number 70 Certification, which is an auditing standard developed by the American Institute of Certified Public Accountants. It meets privacy standards created by the Health Insurance Portability and Accountability Act. All accounts are protected by passwords and HTTP referrer checking (Qualtrics, 2012). Following each participant's completion of the questionnaire, data was automatically uploaded to the Qualtrics server. In regard to the management of the collected data,

only the primary researcher had access to the data on the Qualtrics server. The data was subsequently stored on a password protected USB Flash drive.

4.2.3.4 Part A: Pre-experimental procedure. Part A was comprised of an online questionnaire. The initial two pages of Part A provided a brief summary of the research, the voluntary nature of participation, inclusion criteria, and contact details for the primary researcher (refer to Appendix J for details). The subsequent pages included a screening measure for an eating disorder or elevated anxiety (i.e., PHQ subscales), a measure of intolerance of uncertainty (i.e., the IUS-12, embedded in items from the NEO-FFI to disguise the purpose of the measure), and an assessment of shape and weight overvaluation (i.e., two EDE-Q items, embedded in items assessing the importance of other life domains to disguise the purpose of the measure). Finally, participants created a code word to later match their data from Part A and B. This code allowed the questionnaires to be linked without using any identifying information.

4.2.3.5 Part B: Experimental procedure. When participants arrived at the laboratory, they were asked to seat themselves at a computer. Participants were required to enter two code words. The first code word, which had been provided to participants at the end of Part A, randomly assigned participants to an experimental condition (with the exception of vulnerable participants who received a code word automatically assigning them to the low intolerance of uncertainty condition). Participants were then automatically directed to the Part B questionnaire corresponding to their experimental condition. The second code word, which was created by the participant in Part A, was then entered by the participant to match their Part B input to their Part A data. Information regarding demographic and background variables was collected and the experimental manipulation was subsequently induced. The experimental manipulation consisted of three components, namely, (1) the linguistic manipulation of the IUS, (2) corresponding false feedback regarding the participant's

tolerance of uncertainty, and (3) a request to write a paragraph in support of the stance indicated in the false feedback.

Firstly, in the linguistic manipulation of the IUS, the item wording was manipulated to influence the likelihood of item endorsement. In the high intolerance of uncertainty condition, items were presented with the qualifier, *occasionally*, to encourage the endorsement of more items. For example, "Uncertainty makes me uneasy, anxious, or stressed" was adjusted to, "Uncertainty occasionally makes me uneasy, anxious, or stressed". In this condition, increased item endorsement is expected to lead the participant to perceive themselves as more intolerant of uncertainty, since they observe themselves responding affirmatively to more items. Conversely, in the low intolerance of uncertainty condition, items were presented with the qualifier, *almost always*, to reduce the likelihood of item endorsement. In the above example, the same item was adjusted to, "Uncertainty almost always makes me uneasy, anxious, or stressed." Reduced item endorsement was expected to lead the participant to perceive herself as more tolerant of uncertainty, since they observe themselves responding negatively to more items.

Secondly, following completion of the modified IUS, participants were provided with false feedback regarding their tolerance of uncertainty, based on their condition and the number of items endorsed on the IUS. The believability of the feedback was expected to be increased by the first component of the manipulation, that is, inducing participants to respond in a way that is more or less indicative of an intolerance of uncertainty. The linguistic manipulation was not expected to be successful for participants who were naturally at the opposite, extreme end of the scale, that is, participants with a pre-existing exceptionally high or low tolerance of uncertainty. As such, cut-off points were established to determine whether participants would receive the feedback consistent with their condition, addressing a potential limitation of false

feedback manipulations in that participants may be suspicious of feedback when it is highly inconsistent with their natural position (Petrocelli, Martin, & Li, 2010). The cut-off points were, however, differentially set across conditions to increase the likelihood that participants would receive condition-consistent feedback. That is, participants in the high intolerance of uncertainty condition were only required to endorse five (or more) items to receive the feedback indicative of a high intolerance of uncertainty. Conversely, participants in the low intolerance of uncertainty condition were only required to have limited endorsement of 15 (or fewer) items in order to receive the feedback indicative of a low intolerance of uncertainty. Participants who did not meet the cut-offs for their condition were given the opposite feedback, since it was unlikely they would believe the condition-consistent feedback. The specific feedback utilised in the current study (see Appendix L) was adapted from the feedback created by Rosen and colleagues (2007), which was derived from the definition of intolerance of uncertainty by Freeston and colleagues (1994).

Finally, in the third component of the manipulation, participants were requested to write a paragraph from the perspective of their feedback. That is, for participants who received feedback indicative of a high intolerance of uncertainty, the subsequent request stated, "We would like you to write a paragraph from your own perspective regarding the benefits of certainty and the advantages gained by not tolerating uncertainty." For participants who received feedback indicative of a low intolerance of uncertainty, the subsequent request stated, "We would like you to write a paragraph from your own perspective regarding the benefits of uncertainty and the advantages of being comfortable with uncertainty." In both conditions, this request was supplemented with the statement, "We hope to use this information as part of an educational program for students." This agenda was conveyed in order to disguise the true purpose of the manipulation and to encourage greater effort in generating a response.

An instance of uncertainty was subsequently introduced to allow for the assessment of participants' responses to uncertainty following the experimental manipulation. Uncertainty was induced by informing participants that they would be asked to eat a "small snack" and comment on the properties of the food, which was again framed under the guise of informing an educational program. This request created an instance of eating-related uncertainty for participants, due to the uncertain composition of the food. The nature of the snack was not described at this point. Participants were then asked to complete three questionnaires before the snack was presented, which included the assessment of positive and negative affect (as measured by the PANAS), dieting intentions (as measured by the DIS), and body image anxiety (as measured by the PASTAS).

Following completion of the three questionnaires, participants were provided with a choice of two snacks (i.e., a "Daybrook Strawberry Fruit Bar" or a "Daybrook Apricot Muesli Bar"). The food descriptors were fictitious, in order to avoid the influence of previous exposure to or knowledge of the food. At this point, participants were also presented with a hyperlink to *Nutritional Information* (appearing below the food choices). Whether or not the participant clicked on this link was recorded.

After the participant chose a snack, a manipulation check was undertaken to determine the believability of the earlier, false feedback. Participants were asked, "To what extent do you think your feedback regarding tolerance of uncertainty was true of you?" on a scale of 1 (*not at all true of me*) to 7 (*very true of me*). Finally, participants were informed that the study was complete and that they would not be required to consume any food. Each participant was individually debriefed by the researcher.

4.2.4 Statistical analysis. Data screening and cleaning were undertaken using procedures outlined in Tabachnick and Fidell (2007). Pearson correlations were computed between all relevant measures. Demographic characteristics and pre-

experimental measures were compared across experimental conditions using independent samples t-tests with Levene's test for equality of variances and equality of means tests ($p < .05$) and chi-square tests ($p < .05$). Baseline intolerance of uncertainty and BMI were compared across the four groups using one-way between-groups analyses of variance (ANOVAs). Group differences were subsequently analysed using post-hoc HSD Tukey tests applying a p value of .05.

In testing the specific hypotheses, two-way between-groups analyses of variance (ANOVAs) were conducted to examine main and interaction effects of the intolerance of uncertainty condition (high, low) and shape/weight overvaluation (high, low) on each of the three continuous dependent variables (i.e., negative affect, dieting intentions, and weight-related anxiety). A p value of .05 was applied to determine significance. Effect sizes were reported as partial eta squared values and evaluated using Cohen's (1988) criteria. Finally, direct logistic regression was performed to assess the impact of intolerance of uncertainty, shape/weight overvaluation, or their interaction on the fourth dependent variable, namely, nutritional information seeking. All analyses of the data were conducted using the Statistical Package for the Social Sciences (SPSS), Version 21.0.

4.3 Results

4.3.1 Data screening and cleaning. Data was transferred electronically from Qualtrics to an SPSS spreadsheet, avoiding any possible error resulting from the manual input of data. All relevant variables were screened for missing values, normality, linearity, homoscedasticity, multicollinearity, and the presence of univariate and multivariate outliers using procedures outlined in Tabachnick and Fidell (2007).

4.3.1.1 Missing or implausible data. Participants who completed Part A but did not complete Part B were deleted from the dataset ($n = 10$). The Part A data for these excluded participants did not differ significantly from the Part A data for participants

who also completed Part B, with regard to BMI, intolerance of uncertainty and shape/weight overvaluation. All participants who began Part B completed the study. For both the Part A and Part B questionnaires, complete responses were required in each section before the subsequent section became accessible, thus no data was missing from the remaining respondents. Descriptives were utilised to investigate the possibility of out-of-range or implausible values for the dataset. All data was within the ranges specified, the means and standard deviations were plausible, and no out-of-range values existed for discrete variables.

4.3.1.2 Assumption testing. Exploratory data analysis was undertaken for all variables to ensure that the statistical assumptions underlying the subsequent procedures were not violated. To investigate normality, the skewness and kurtosis levels for each variable were calculated and the histograms were examined. For each variable, the presence of skewness and kurtosis was considered acceptable and appropriate based on the expected curve of the sample.

Linearity and homoscedascity were assessed through the inspection of bivariate scatterplots in conjunction with descriptive data output. These assumptions were not considered to be violated for any variable. Multicollinearity and singularity were assessed by investigating a correlation matrix consisting of all the relevant variables. No redundancy was found, that is, no measures were unexpectedly highly correlated (above .90).

4.3.1.3 Outliers. No univariate outliers were found. Mahalanobis distances were utilised to investigate the possibility of multivariate outliers. Regression analysis was conducted to determine the Mahalanobis distance for each participant, which was subsequently evaluated using the critical Chi-Squared value (Tabachnick & Fidell, 2007). No multivariate outliers were found with a $p < .001$. Cook's distance did not exceed 0.40 for any variables.

4.3.2 Manipulation checks. In order to assess the validity of the manipulation, two tests were performed. Firstly, the overall success of the manipulation was assessed by comparing the mean number of items endorsed on the IUS in each experimental condition, that is, the high and low intolerance of uncertainty conditions. The mean difference in item endorsement was used as an indicator of the success of the manipulation, in line with the procedure outlined by Rosen and colleagues (2007). It was expected that the high intolerance of uncertainty condition would produce a higher mean number of endorsed items than the low intolerance of uncertainty condition, since item wording was adjusted to encourage this difference in endorsement. An independent samples t-test indicated that participants in the high intolerance of uncertainty condition endorsed a significantly higher number of items ($M = 14.54$, $SD = 4.88$) compared to participants in the low intolerance of uncertainty condition ($M = 8.15$, $SD = 5.57$), $t(89) = 5.81$, $p < .001$.

A direct manipulation check (i.e., asking participants how well they tolerate uncertainty) was not feasible, since the feedback component invalidates the legitimacy of direct questioning, given that the participants have already been informed that they are either tolerant or intolerant of uncertainty. However, a secondary manipulation check was undertaken in order to assess the validity of the feedback component of the manipulation. Participants were asked, at the completion of the study, to what extent they believed the feedback regarding their tolerance of uncertainty was true of them. Approximately 85% of participants ($n = 78$) reported their feedback as *somewhat true of me* or higher. Participants who indicated *not at all true of me* were excluded from subsequent analyses, resulting in the deletion of four participants.

Following the manipulation checks, two further assessments were made in order to restrict the final data set to only those participants for whom the manipulation was deemed to be successful. Firstly, individual cases were assessed to determine whether

the appropriate feedback was provided for each participant's assigned condition. In line with the procedure undertaken by Rosen and colleagues (2007), participants were excluded from subsequent analysis if they endorsed too few or too many items to receive the appropriate feedback for their condition, resulting in the exclusion of four participants.

Secondly, as an additional method for assessing the success of the manipulation for individual participants, the paragraph written by each participant was analysed to determine (a) the ability of the participant to convey their message in English, indicative of their overall understanding of the experiment (this was undertaken due to the high number of participants with English as a second language), and (b) whether the participant's individual response was in line with what was requested, that is, whether the response complied with the instructions. The primary researcher coded these responses and discussed inconsistent or unclear responses with a senior researcher. Inconsistent responses were excluded from subsequent analysis since participants had not followed the instructions of the manipulation, resulting in the exclusion of 11 participants and producing a final sample of 72 participants.

4.3.3 Descriptive statistics. Descriptive statistics for each relevant measure by condition for the final sample of 72 participants are presented in Table 4.3. The descriptive statistics are further categorised by final group in Table 4.4. The mean BMI for the sample was in the normal range at 21.31 (SD = 3.0).

Table 4.3

Descriptive Statistics for Part A and Part B Measures by Condition

Variable	Total sample		High IU condition		Low IU condition	
	Min	*Max*	*Mean*	*SD*	*Mean*	*SD*
Part A						
BMI	16.02	29.74	21.77	3.44	20.72	2.34
IUS-12	16.00	52.00	34.35	9.01	32.19	6.97
EDE-Q shape overvaluation	1.00	7.00	4.28	1.87	3.84	1.97
EDE-Q weight overvaluation	1.00	7.00	3.83	1.87	3.50	2.16
Part B						
IUS-adapted	0.00	25.00	15.33	4.66	6.88	4.28
PANAS Negative Affect	10.00	27.00	15.65	5.08	14.53	6.80
PANAS Positive Affect	13.00	47.00	23.80	6.53	25.94	8.01
DIS	1.00	6.86	4.30	1.39	3.87	1.60
PASTAS Weight Scale	0.00	3.25	1.54	0.90	1.23	0.89

Note. IU: Intolerance of uncertainty; BMI: Body Mass Index; IUS-12: Intolerance of Uncertainty Scale Short-Form; EDE-Q: Eating Disorder Examination-Questionnaire; IUS-adapted: Intolerance of Uncertainty Scale with the linguistic manipulation; PANAS: Positive And Negative Affect Schedule; DIS: Dieting Intentions Scale; PASTAS: Physical Appearance State Trait Anxiety Scale; $N = 72$.

Table 4.4

Descriptive Statistics for Part A and Part B Measures by Group

Variable	High IU, High S/W		High IU, Low S/W		Low IU, High S/W		Low IU, Low S/W	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
Part A								
BMI	23.12	3.93	20.55	2.42	21.47	2.01	20.13	2.46
IUS-12	37.58	8.81	31.43	8.34	33.71	6.68	31.00	7.15
EDE-Q shape overvaluation	5.89	0.74	2.81	1.25	5.71	0.91	2.39	1.15
EDE-Q weight overvaluation	5.37	1.26	2.43	1.03	5.64	0.84	1.83	1.10
Part B								
IUS-adapted	15.42	4.09	15.24	5.22	7.71	3.95	6.22	4.52
PANAS Negative Affect	16.16	5.16	15.19	5.10	13.14	4.15	12.94	3.52
PANAS Positive Affect	23.16	6.72	24.38	6.46	24.07	6.40	27.39	8.97
DIS	4.79	1.12	3.86	1.48	4.72	1.30	3.21	1.53
PASTAS Weight Scale	1.95	0.71	1.17	0.91	1.56	1.03	0.97	0.70

Note. IU: Intolerance of uncertainty; S/W: Shape/Weight Overvaluation; BMI: Body Mass Index; IUS-12: Intolerance of Uncertainty Scale Short-Form; EDE-Q: Eating Disorder Examination-Questionnaire; IUS-adapted: Intolerance of Uncertainty Scale with the linguistic manipulation; PANAS: Positive And Negative Affect Schedule; DIS: Dieting Intentions Scale; PASTAS: Physical Appearance State Trait Anxiety Scale; $N = 72$.

4.3.3.1 Correlational analyses. Correlational analyses indicated several significant relationships of varying degree between the relevant variables. The EDE-Q shape and weight overvaluation items were most highly correlated ($r = .78$, $p < .001$), in line with expectations. Other eating- or weight-related variables showed moderate correlations, as expected (e.g., $r = .65$, $p < .001$, for dieting intentions and weight-related body image anxiety). The relevant correlations are presented in Table 4.5.

Table 4.5

Correlation Analyses

	Correlations							
Variable	1	2	3	4	5	6	7	8
1. BMI	1.00							
2. IUS-12	.08							
3. EDE-Q shape overvaluation	.36**	.35**						
4. EDE-Q weight overvaluation	.28*	.33**	.78**					
5. IUS-adapted	.09	.56**	.19	.21				
6. PANAS Negative Affect	.05	.28*	.09	.15	.40**			
7. PANAS Positive Affect	-.03	-.03	-.12	-.10	-.21	.17		
8. DIS	.36**	.11	.45**	.41**	.21	.30*	-.28*	
9. PASTAS Weight Scale	.31**	.42**	.47**	.45**	.34**	.44**	.04	.65**

Note. BMI: Body Mass Index; IUS-12: Intolerance of Uncertainty Scale Short-Form; EDE-Q: Eating Disorder Examination-Questionnaire; IUS-adapted: Intolerance of Uncertainty Scale with linguistic manipulation; PANAS: Positive And Negative Affect Schedule; DIS: Dieting Intentions Scale; PASTAS: Physical Appearance State Trait Anxiety Scale; $N = 72$.

*$p < .05$, ** $p < .01$

4.3.4 Comparison of experimental conditions. Verification tests found that the two experimental conditions (high and low intolerance of uncertainty) did not differ significantly on a number of demographic variables, including age ($p = .907$), region of birth ($p = .229$), living arrangement ($p = .965$), completed education ($p = .636$), studying status ($p = .368$), and employment status ($p = .709$). The groups also did not differ significantly on the pre-manipulation measures administered in Part A, including BMI, t (68) = 1.55, $p = .13$; intolerance of uncertainty, t (70) = 1.12, $p = .27$; shape overvaluation, t (70) = 0.95, $p = .35$; and weight overvaluation, t (70) = 0.69, $p = .50$. The means and standard deviations for these variables are provided in Table 4.3. The results suggest that the randomisation process created two initially equivalent groups.

4.3.5 Shape/weight overvaluation. A categorical shape/weight overvaluation variable was created using data from participants' responses to the Part A measurement of the overvaluation of shape and weight (as measured by two items from the EDE-Q). This combination was supported by the high correlation observed between the two items ($r = .78, p < .001$). Participants who indicated either shape or weight to be highly important or indicated both shape and weight as moderately important were allocated to the high shape/weight overvaluation group. The remaining participants were allocated to the low shape/weight overvaluation group. The categorisation of participants into high and low shape/weight overvaluation, in conjunction with the intolerance of uncertainty manipulation, resulted in the creation of four groups. The means and standard deviations for these variables are provided in Table 4.4.

Univariate analyses were conducted to assess whether the four groups differed in baseline intolerance of uncertainty or BMI. Univariate analysis revealed a statistically significant difference in baseline intolerance of uncertainty across groups, F (3, 72) = 2.77, $p = .05$. The effect size was large (partial eta squared = .11). Post-hoc comparisons using the Tukey HSD test indicated that the mean intolerance of

uncertainty for the high intolerance of uncertainty / high shape/weight overvaluation group ($M = 37.58$, $SD = 8.81$) was significantly different from the high intolerance of uncertainty / low shape/weight overvaluation group ($M = 31.43$, $SD = 8.34$) and the low intolerance of uncertainty / low shape/weight overvaluation group ($M = 31.00$, $SD = 7.15$), but was not differ significantly from the low intolerance of uncertainty / high shape/weight overvaluation condition ($M = 33.71$, $SD = 6.68$). The remaining groups did not demonstrate significant differences in mean intolerance of uncertainty. These findings suggest a trend for a higher intolerance of uncertainty to be associated with higher shape/weight overvaluation. This association is consistent with previous research which suggests a high intolerance of uncertainty to be associated with more problematic eating attitudes and eating disorder symptoms (e.g., Konstantellou & Reynolds, 2011). It was therefore determined that intolerance of uncertainty would not be controlled for in subsequent analyses, since it may remove part of a genuine shape/weight overvaluation effect. For exploratory purposes, the analyses were re-run with intolerance of uncertainty as a covariate, however this did not change the overall pattern or significance of results. As such, these analyses are not reported.

Univariate analysis also revealed a statistically significant difference in BMI across groups, $F(3, 72) = 4.13$, $p = .01$. The effect size was large (partial eta squared = .15). Post-hoc comparisons using the Tukey HSD test indicated that the mean BMI for the high intolerance of uncertainty / high shape/weight overvaluation group ($M = 32.12$, $SD = 3.93$) was significantly different from the high intolerance of uncertainty / low shape/weight overvaluation group ($M = 20.55$, $SD = 2.42$) and the low intolerance of uncertainty / low shape/weight overvaluation group ($M = 20.13$, $SD = 2.46$), but was not differ significantly from the low intolerance of uncertainty / high shape/weight overvaluation condition ($M = 21.47$, $SD = 2.01$). The remaining groups did not demonstrate significant differences in mean BMI. These findings suggest a trend for a

higher BMI to be associated with higher shape/weight overvaluation. The association between higher BMI and higher shape/weight overvaluation is consistent with previous research (e.g., Arriaza & Mann, 2001). It was therefore also determined that BMI would not be controlled for in subsequent analyses, since it also may remove part of the genuine shape/weight overvaluation effect. For exploratory purposes, these analyses were also re-run with BMI as a covariate, however this again did not change the overall pattern or significance of results. As such, these analyses are also not reported.

4.3.6 State negative affect. A two-way between-groups analysis of variance (ANOVA) was conducted to examine the impact of intolerance of uncertainty (high, low) and shape/weight overvaluation (high, low) on negative affect, as measured by the Negative Affect scale of the PANAS. There was a statistically significant main effect for intolerance of uncertainty, $F(1, 68) = 5.78$, $p = .02$, with a medium effect size (partial eta squared = .078), indicating that, as hypothesised, participants in the high intolerance of uncertainty condition experienced higher negative affect than participants in the low intolerance of uncertainty condition. However, contrary to hypotheses, neither the main effect for shape/weight overvaluation, $F(1, 68) = .28$, $p = .60$ (partial eta squared = .004), or the interaction effect between intolerance of uncertainty and shape/weight overvaluation was statistically significant, $F(1, 68) = .12$, $p = .73$ (partial eta squared = .002).

4.3.7 Current dieting intentions. A two-way between-groups ANOVA was conducted to examine the impact of intolerance of uncertainty and shape/weight overvaluation on dieting intentions, as measured by the DIS. The main effect for intolerance of uncertainty, $F(1, 68) = 1.21$, $p = .27$, was not statistically significant (partial eta squared = .018). As expected, there was a statistically significant main effect for shape/weight overvaluation, $F(1, 68) = 13.97$, $p = .001$, with a large effect size (partial eta squared = .170). These results indicate that individuals with a high

shape/weight overvaluation reported higher dieting intentions than individuals with a low shape/weight overvaluation. Contrary to expectations, the interaction effect between intolerance of uncertainty and shape/weight overvaluation was not statistically significant, F (1, 68) = .79, p = .38 (partial eta squared = .011).

4.3.8 Weight-related state body image. A two-way between-groups ANOVA was similarly conducted to examine the impact of intolerance of uncertainty and shape/weight overvaluation on weight-related body image anxiety, as measured by the state version of the PASTAS Weight scale. The main effect for intolerance of uncertainty, F (1, 68) = 2.22, p = .14, did not reach statistical significance (partial eta squared = .032). As hypothesised, there was a statistically significant main effect for shape/weight overvaluation, F (1, 68) = 12.10, p = .001, with a large effect size (partial eta squared = .151). These results indicate that individuals with a high shape/weight overvaluation reported higher weight-related body image anxiety than individuals with a low shape/weight overvaluation. Yet, the interaction effect between intolerance of uncertainty and shape/weight overvaluation was not statistically significant, F (1, 68) = .23, p = .64 (partial eta squared = .003).

The above analyses were also conducted using linear regression analyses with shape and weight overvaluation included as a continuous measure. However, the same pattern of findings was indicated, and thus these analyses are not reported here. In addition, the analyses were repeated for a reduced subset of participants who provided a particularly strong argument in support of their assigned condition. Although the strength of some associations was slightly increased, the same pattern of results was found and, as such, these results are also not reported here.

4.3.9 Nutritional information seeking across groups. Table 4.6 presents the number of participants who sought nutritional information regarding the snack they were asked to consume across each condition.

Table 4.6

Experimental Condition by Search for Nutritional Information

		Search for nutritional information		Total number of participants
		Yes	No	
Condition	High IU, High S/W	3	16	19
	Low IU, High S/W	2	12	14
	High IU, Low S/W	5	16	21
	Low IU, Low S/W	4	14	18
		14	58	72

Note. IU: Intolerance of uncertainty; S/W: Shape/Weight Overvaluation; $N = 72$.

Direct logistic regression was performed to assess the impact of intolerance of uncertainty and shape/weight overvaluation on the likelihood that participants would click to view nutritional information regarding the food they were requested to eat. The full model was not statistically significant, χ^2 (2, $N = 72$) = 0.76, $p = .69$. Neither of the independent variables (intolerance of uncertainty condition nor shape/weight overvaluation) made a statistically significant contribution to the model.

4.4 Discussion

In response to previous correlational research demonstrating covariation between intolerance of uncertainty and eating disorder symptoms, the current study sought to experimentally manipulate intolerance of uncertainty with the aim of examining its potential role as a causal maintenance factor for eating disorder symptoms. This study is the first known research to specifically test the causal effects of intolerance of uncertainty on eating disorder symptoms using an experimental

methodology. The study also sought to assess the role of shape/weight overvaluation in increasing vulnerability to the impact of high intolerance of uncertainty on eating disorder-related symptoms, namely, negative affect, dieting intentions, weight-related body image anxiety, and checking behaviour in the form of seeking information on the nutritional content of a food.

4.4.1 Findings of the present study. It was hypothesised that a high intolerance of uncertainty, high shape/weight overvaluation, and their interaction would be associated with significantly higher negative affect. A significant main effect was found for intolerance of uncertainty, in line with the hypothesis, but no main effect was found for shape/weight overvaluation or an interaction effect. While no support was found for the hypotheses in regard to shape/weight overvaluation, the finding indicating a high intolerance of uncertainty to induce heightened negative affect is consistent with previous research indicating that intolerance of uncertainty is associated with, and elicits, negative affect (Buhr & Dugas, 2006; Greco & Roger, 2003; Sexton & Dugas, 2009).

A converse pattern of results was found for the dependent variables of dieting intentions and state body image anxiety. Here, there were significant main effects for shape/weight overvaluation but no main effect for intolerance of uncertainty or an interaction effect. More specifically, high shape/weight overvaluation was found to be associated with increased dieting intentions and weight-related body image anxiety, in comparison to low shape/weight overvaluation. This relationship was expected, based on the substantial body of research identifying shape and weight concerns (particularly overvaluation) as central to the development and maintenance of eating disorder symptoms (e.g., Fairburn, 2008; Fairburn et al., 2003; Killen et al., 1996; Killen, Hayward, et al., 1994). Shape and weight concerns have also been specifically linked with dietary restraint (e.g., Gowers & Shore, 2001; Laessle et al., 1989; Ross & Wade,

2004), which is strongly associated with dieting intentions. In addition, body dissatisfaction (i.e., weight-related body image anxiety) has been found to be higher in individuals who place a high investment in their shape/weight (Cooper & Fairburn, 1993; Garfinkel et al., 1992; Hrabosky et al., 2007). Therefore, although these relationships have been acknowledged previously, the identification of these well-established links in the current study supports the quality of the collected data and reaffirms these associations.

Intolerance of uncertainty, conversely, did not predict the degree of dieting intentions or weight-related body image anxiety. Thus, the hypothesis that a high intolerance of uncertainty (especially in combination with high shape/weight overvaluation) would cause increased dieting intentions (in the context of needing to consume a snack of uncertain nutritional content), employed as a mechanism for coping with uncertainty, was not supported. In addition, the hypothesis that a high intolerance of uncertainty (particularly in combination with high shape/weight overvaluation) would cause increased weight-related anxiety, presenting as a reaction to eating-related uncertainty, was also not supported. These unexpected results may be due to a number of factors. Firstly, the specific type of uncertainty is likely to affect the precise cognitive, emotional, and behavioural reactions and the type of coping strategy employed in response to the uncertainty. Although the uncertainty induced in the current study related specifically to eating, it is possible that different coping strategies that were not assessed in the study (e.g., refusal to eat the food, or only eating a small portion of the food) may be more likely to be employed. Secondly, it is possible that more intense uncertainty may be required to invoke the immediate use of coping strategies. For example, after an episode of binge eating, the uncertainty regarding its impact on weight and corresponding negative affect may be sufficiently heightened to generate the immediate use of coping strategies, such as dietary restraint, dieting

intentions, or purging behaviours. Future research investigating this possibility appears warranted, however an experimental methodology would require careful consideration of the ethical implications of inducing a more intense form of uncertainty. Thirdly, an intolerance of uncertainty may need to be amplified in the specific domain of eating, shape, and weight in order to prompt eating disorder symptoms in response to eating-related uncertainty, especially for individuals with high shape/weight overvaluation. In the current research, a generalised intolerance of uncertainty was manipulated. While the earlier studies of the current research project postulated that a general intolerance of uncertainty may still predict increased eating disorder symptoms, albeit more weakly, this was not observed in the current study. Together, the findings from across the studies in the present research program suggest that domain-specific intolerance of uncertainty is more strongly implicated in domain-specific symptom responses.

The above considerations may also explain why there was no support for the hypothesised associations between intolerance of uncertainty and shape/weight overvaluation on the dependent measure of checking behaviour. In response to the request to eat a food of unknown composition, it was hypothesised that participants in the high intolerance of uncertainty condition would be more likely to access nutritional information regarding the food to be consumed, in order to reduce the uncertainty. Nutritional information seeking was also expected to be generally higher for participants with high shape/weight overvaluation. However, logistic regression analysis found neither the intolerance of uncertainty condition nor the degree of shape/weight overvaluation to predict the likelihood of seeking nutritional information.

4.4.2 Proposed model of intolerance of uncertainty in the eating disorders context. In the second study of the current research project, intolerance of uncertainty specific to eating, shape, and weight was proposed as a possible mediator of the relationship between shape and weight concerns and dietary restraint. Further to this,

intolerance of uncertainty was suggested as a potentially distal factor in the maintenance of eating disorder symptoms, serving to induce heightened negative affect and subsequently prompt dietary restraint as a mechanism for both reducing the uncertainty and coping with the associated negative affect. In the current study, general intolerance of uncertainty was manipulated, thus the model outlined in the second study was not directly tested. The primary aim of the research was to ensure a thorough investigation into the role of intolerance of uncertainty in the context of eating disorder symptoms, and it was thus considered premature to dismiss the role of a generalised intolerance of uncertainty based on the preliminary findings. As such, the general intolerance of uncertainty construct was tested.

Despite general intolerance of uncertainty not being found to predict specific outcomes associated with eating, shape, and weight (i.e., dieting intentions, weight-related body image anxiety, and nutritional information seeking), general intolerance of uncertainty was found to predict negative affect, lending preliminary support to the hypothesis that a high intolerance of uncertainty may induce heightened negative affect. The second component of this process, however, suggesting that dietary restraint or other eating disorder behaviour may ensue, although partially supported by the findings of the first and second studies, was not supported by the current research. As indicated above, this may be due to several factors, such as (a) the induction of an insufficient intensity of intolerance of uncertainty, or (b) the use of an alternate coping strategy not assessed by the current research, or (c) the requirement of an intolerance of uncertainty specifically in the domain of eating, shape, and weight in order to sufficiently amplify the uncertainty response and trigger eating disorder symptoms.

4.4.3 Theoretical implications. The findings of the current research suggest a number of considerations for the conceptualisation of intolerance of uncertainty. Firstly, although the research did not observe a direct relationship between intolerance

of uncertainty and eating disorder symptoms, there was some support for intolerance of uncertainty as a trigger of emotional distress. Previous theoretical and empirical research has identified negative affect to be an important variable in the maintenance of eating disorder symptoms (e.g., Cooley & Toray, 2001; Stice, 2001). With this consideration, it is considered premature to dismiss the role of a general intolerance of uncertainty in affecting eating disorder symptoms. Rather, it is proposed that intolerance of uncertainty could indeed be a distal factor, leading to increased negative affect in response to uncertainty. If the negative affect is sufficiently heightened, such an intolerance may then prompt eating disorder symptoms over time. This successive pathway does, however, require further research to determine its validity.

The above proposal is consistent with the conceptualisation of intolerance of uncertainty as an underlying, general vulnerability factor shared across a range of clinical disorders. As proposed by Carleton, Sharpe, and Asmundson (2007), and discussed in the second study of the current research project, individuals with a high intolerance of uncertainty may experience a uniform reaction to uncertainty (e.g., emotional distress), however their mechanisms for coping may differ. The specific mechanism for coping may contribute to the presentation of their specific clinical disorder. For individuals with high eating, shape, and weight concerns, eating disorder behaviour may be employed as a coping strategy for dealing with the negative affect arising from an intolerance of uncertainty. In other disorders, alternate coping strategies may be employed (e.g., social avoidance in social anxiety disorder; Carleton, Collimore, & Asmundson, 2010). While specific coping strategies were not observed in the current study (i.e., intolerance of uncertainty did not predict dieting intentions or checking behaviour), this may be due to an insufficiently intense uncertainty induction, or the use of a different strategy for coping to those that were assessed. Further research using a clinical sample would be beneficial for clarifying the mechanisms of association

between the experience of uncertainty, corresponding negative affect, and the use of specific eating disorder behaviours as a mechanism for coping with the uncertainty and/or corresponding affect.

4.4.4 Strengths and limitations of the study and avenues for future research. The current study possessed several strengths. Firstly, the use of an experimental methodology enabled the investigation of causal associations between the constructs examined. More specifically, an experimental methodology enables between-group differences on outcome measures to be attributed specifically to the preceding manipulation. The use of an experimental methodology builds on the covariation established in the second study by addressing the second and third requirements of a causal relationship, namely temporal antecedence and non-spuriousness (see Garber & Hollon, 1991). In addition, this was the first known experimental study investigating the effect of intolerance of uncertainty in the context of eating disorder symptoms. The study extended an experimental manipulation of intolerance of uncertainty previously undertaken by Rosen and colleagues (2007), with the inclusion of a component based on dissonance theory. This inclusion extended the scope of intolerance of uncertainty being manipulated. The study also induced the same form of uncertainty across participants (i.e., the request to consume an unknown food), and only manipulated participants' intolerance of uncertainty. The manipulation of intolerance, rather than the type of uncertainty itself, avoided the previous confusion in the manipulation of intolerance of uncertainty, which resulted in the perceived degree of uncertainty, rather than actual tolerance of uncertainty, being manipulated (e.g., Ladouceur, Gosselin, & Dugas, 2000). Given the small body of research which has experimentally manipulated the intolerance of uncertainty construct, the current procedure illustrates an additional method employable by future research studies intending to manipulate intolerance of uncertainty.

The current study also included a number of limitations that warrant consideration in interpreting the findings. Firstly, although the manipulation checks and subsequent analyses suggest that the manipulation was successful, it cannot be confirmed that only intolerance of uncertainty was manipulated, and not other variables, such as self-esteem (e.g., potentially affected by the interpretation of the feedback). The study aimed to address this particular possibility by phrasing the feedback more neutrally in both conditions, however future research may benefit from controlling for such potentially related constructs. This limitation has been previously identified in the research by Rosen and colleagues (2007) and earlier studies attempting to manipulate intolerance of uncertainty. A specific challenge pertains to the strong relationship between intolerance of uncertainty and a number of other cognitive constructs, such as worry (see Rosen et al., 2007).

Secondly, the uncertainty induced in the current study was relatively mild. That is, although uncertainty regarding the composition of food may be highly aversive for particular individuals (such as individuals with a diagnosed eating disorder), this instance of uncertainty may not reach the intensity required to observe a significant response for the majority of individuals in a community-based sample. In addition, individuals face a host of uncertainties on a day-to-day basis and, even with a high intolerance of uncertainty, it is not expected that each of these instances will necessarily be recognised or construed as an instance of uncertainty. Clearer insight may therefore be gained by the inclusion of a more intense uncertainty experience in future experimental research.

Another consideration in the current research pertains to the dependent variables under investigation. In the current study, only a small number of possible outcomes of a high intolerance of uncertainty were assessed (i.e., negative affect, dieting intentions, weight-related anxiety, and checking behaviour). As outlined in the first and second

studies of the current research project, a range of other possible responses to eating-related uncertainty exist, including dietary restriction, purging, ritualistic behaviour (e.g., following a set order in food consumption), and other checking behaviour (e.g., weighing food or weighing oneself). It would be useful for future research to investigate other behaviours which may be employed in response to uncertainty in the eating disorder context. Research employing a clinical sample would be highly valuable, however an alternative methodology may be required, since a higher proportion of individuals in a clinical sample is expected to already maintain a particularly strong intolerance of uncertainty, in which case the current manipulation may not be effective. The use of clinical samples also raises ethical concerns regarding exposing these vulnerable individuals to potential causal maintenance factors.

Future research manipulating intolerance of uncertainty specific to eating, shape, and weight may also be valuable for assessing more direct relationships between intolerance of uncertainty and eating disorder symptoms. Manipulation of intolerance of uncertainty specific to eating and weight may be achieved through a comparable procedure to that employed in the current study, incorporating a linguistic manipulation of the Intolerance of Uncertainty subscale of the Obsessive Beliefs Questionnaire – Eating Disorder Version (OBQ-EDV; Schembri, 2010), which was utilised in the second study of the current research project. This manipulation is recommended for use with a sample of individuals reporting at least moderate pre-existing eating, shape, or weight concerns, since a context-specific intolerance of uncertainty is theorised to develop in an existing domain of concern.

Future research manipulating general intolerance of uncertainty may consider the use of a more recently developed measure of intolerance of uncertainty in creating the linguistic manipulation, namely, the Intolerance of Uncertainty Inventory (IUI; Gosselin et al., 2008). While the IUS appears to have successfully manipulated

intolerance of uncertainty in the current study and previous research (Rosen et al., 2007), a number of concerns have been raised about the validity of the IUS as a coherent measure of the intolerance of uncertainty construct (e.g., Carleton, Norton, & Asmundson, 2007; Norton, 2005). As such, alternative measures may be worthy of consideration. Furthermore, Part A of the IUI includes items specifically addressing the tendency to consider uncertainty as unacceptable, as distinct from Part B, which incorporates cognitive and behavioural manifestations of intolerance of uncertainty (Gosselin et al., 2008). Gosselin and colleagues argue that the IUS assesses general reactions to uncertainty, which may not accurately reflect the intolerance of uncertainty construct. A linguistic manipulation employing Part A of the IUI may therefore result in a more precise manipulation of intolerance of uncertainty.

Finally, the third component of the manipulation employed in the current study could be further enhanced in order to strengthen the effect of the manipulation. Previous research offers insight into a number of mechanisms that could increase the strength of the manipulation. Firstly, the resonance of the written paragraph may be increased by asking the participant to recall an instance in which they were uncertain themselves and responded with either a high or low intolerance of uncertainty (depending on the assigned condition). Previous research suggests that autobiographical memories tend to be affectively charged (e.g., Baumgartner, Sujan, & Bettman, 1992), thus a task invoking a participant's own memories is likely to produce stronger emotion than simply providing an intellectual argument for the benefits of either a tolerance or intolerance of uncertainty. In addition, individuals are typically motivated for self-coherence, that is, consistency between recalled memories and the current perception of the self (see Conway, 2005). Based on this premise, the recall of specific autobiographical memories pertaining to tolerance of uncertainty may influence self-perception of one's tolerance of uncertainty, particularly if participants are primed

to be motivated to recall memories supportive of the induced condition, such as by initially suggesting that either an intolerance or tolerance of uncertainty is conducive to success (see Sanitioso & Niedenthal, 2006).

In addition, previous research employing dissonance-based interventions has suggested that increasing the degree of effort, accountability, and the perception of voluntary participation may strengthen the effects of the procedure by increasing dissonance (Stice, Marti, et al., 2008). Furthermore, the effect may be larger when the activities occur across multiple sessions (see Stice, Shaw, et al., 2008), with the incorporation of verbal and behavioural exercises (Stice, Marti, et al., 2008), and if the new attitude is expressed publicly (Green, Scott, Diyankova, & Gasser, 2005). Drawing from motivational enhancement techniques, identification of the costs of the alternate perspective (e.g., describing the costs of tolerating uncertainty, when inducing a high intolerance of uncertainty) may also increase the effectiveness of the manipulation (Stice, Marti, et al., 2008). Such factors are worthy of consideration in further research employing an intolerance of uncertainty manipulation.

4.4.5 Conclusion. The current research comprises the first known study to experimentally manipulate intolerance of uncertainty to investigate outcomes in the eating disorder context. Some evidence was obtained suggesting high intolerance of uncertainty to elicit heightened negative affect following an induction of intolerance of uncertainty, supporting the qualitative descriptions by eating disorder patients in the first study of the current research project. A relationship was not observed between intolerance of uncertainty and dieting intentions, weight-related anxiety or checking the nutritional content of a snack. It is proposed that a more intense instance of uncertainty or the manipulation of intolerance of uncertainty specifically in the domain of eating, shape, and weight may be required to amplify the uncertainty response and produce an effect for eating- and weight-related variables. This proposal is supported by the

findings of the second study of the current research project, which indicated intolerance of uncertainty in the domain of eating and weight to show a stronger relationship with eating disorder symptoms than intolerance of uncertainty in general. A general intolerance of uncertainty may retain an influence on eating disorder symptoms only via the induction of heightened negative affect (which subsequently prompts eating disorder symptoms over time). Future experimental research employing the recommended modifications will be useful in clarifying the mechanisms of association between both general and eating- and weight-specific intolerance of uncertainty and eating disorder symptoms.

Chapter 5: General Discussion

The intolerance of uncertainty construct has received preliminary examination in the context of a range of clinical disorders, particularly in the anxiety disorders field. An elevated intolerance of uncertainty has demonstrated strong links with problematic worry and generalised anxiety (e.g., Dugas et al., 1997; Dugas et al., 1998; Freeston et al., 1994), and has been theorised to be a fundamental construct underlying all anxiety disorders (Carleton, Sharpe, & Asmundson, 2007). Intolerance of uncertainty has more recently been acknowledged in the context of eating disorder symptoms (see Konstantellou & Reynolds, 2010; Sternheim et al., 2011), however extant research investigating this association is limited. Given the co-occurrence and overlap in the features of anxiety and eating disorders, a more detailed investigation of the potential role of intolerance of uncertainty in eating disorders is indicated. A heightened intolerance of uncertainty is likely to warrant attention, since such an intolerance has been linked with a range of negative outcomes for individuals (e.g., worry, low mood, impaired problem solving, and increased physiological arousal; see Chapter 1). The current research has built on the small body of literature examining a relationship between intolerance of uncertainty and eating disorders by conducting a series of three studies, consisting of a qualitative study exploring the experience and consequences of intolerance of uncertainty among patients with an eating disorder, a correlational study investigating the association between intolerance of uncertainty and a key eating disorder symptom (i.e., dietary restraint), and the first study to experimentally manipulate intolerance of uncertainty in order to examine outcomes in the eating disorder context.

5.1 Summary of the Findings

The current research project sought to examine the possible role of intolerance of uncertainty as a maintenance factor for eating disorder symptoms. Although a small

number of studies have previously suggested a link between intolerance of uncertainty and eating disorder symptoms (see section 1.8), further investigation is required to elucidate this relationship. It was hypothesised that, in certain individuals, an elevated intolerance of uncertainty may contribute to increased eating disorder symptoms through the use of eating disorder behaviour as an attempt to reduce uncertainty and corresponding distress. Components of this overarching hypothesis were differentially tested in this series of studies through qualitative, correlational, and experimental research.

The first study involved a qualitative investigation into the experience of uncertainty for eating disorder patients across stages of illness, replicating and extending previous research by Sternheim and colleagues (2011). The second study sought to verify and extend investigation into the link between intolerance of uncertainty and eating disorder symptoms using a correlational methodology. Covariation between the constructs was demonstrated and a model was proposed specifying intolerance of uncertainty specific to eating and weight as a mediator in the relationship between shape and weight concerns and dietary restraint. Finally, the third study utilised an experimental methodology to manipulate intolerance of uncertainty and examine the effect on several constructs previously associated with eating disorder symptoms. The experimental procedure was informed by a manipulation previously employed in a different context (Rosen et al., 2007), with an additional component based on dissonance theory (Festinger, 1957) and dissonance-based interventions applied in the eating disorder context (Stice, Mazotti, et al., 2000). Each of the studies in the current research project provided partial or indirect support for the proposed role of intolerance of uncertainty in the maintenance of eating disorder symptoms, as well as identifying a range of considerations for the conceptualisation of this relationship in future research.

The first study found uncertainty to be typically appraised by eating disorder patients as distinctly negative and pervasive across their lives, presenting across both eating disorder and non-eating disorder contexts. The pervasiveness and intensity of the uncertainty experience appeared heightened by a range of factors, including a fear of making mistakes, perfectionism, biased attention towards uncertainty, and a low sense of agency. These factors correspond to several typical features of an eating disorder presentation established in previous research (Bulik et al., 2003; Dalgleish et al., 2001; Halmi et al., 2000; Minarik & Ahrens, 1996). Patients' subsequent responses to uncertainty consisted predominantly of negative emotional and cognitive reactions (e.g., heightened anxiety and biased thinking), as well as engagement in a range of typically maladaptive coping strategies (e.g., eating disorder behaviours, avoidance, and excessive information seeking). The most prominent coping mechanisms pertained to eating disorder behaviours, and included binge eating (to soothe the negative affect associated with uncertainty), purging and driven exercise (to reduce uncertainty regarding the effect of consumed food, including binges), dietary restraint (to avoid the uncertainty involved in choosing food and uncertain effects of food consumption), and other characteristic eating disorder behaviours (e.g., the use of rigid, ritualised behaviours to increase a sense of certainty).

The findings of the first study were consistent with a previous qualitative investigation into the experience of uncertainty for women with anorexia nervosa (Sternheim et al., 2011), which found that women with anorexia nervosa perceived uncertainty as distinctly negative and responded with a range of negative physical, emotional, and cognitive responses. The current research extended these findings by examining variation in the experience of uncertainty across stage of illness and clarifying specific mechanisms through which an intolerance of uncertainty was perceived as contributing to eating disorder symptoms. The use of eating disorder

behaviours to appease an intolerance of uncertainty and the exacerbation of an intolerance of uncertainty by features typically associated with an eating disorder (such as perfectionism and a fear of mistakes) supports a potential role of intolerance of uncertainty in the maintenance of eating disorder symptoms.

The second study contributed further evidence to this proposed link by examining the interrelationships of intolerance of uncertainty and a range of constructs in a larger, community-based sample of women. The use of a community-based sample allowed for investigation across the spectrum of eating disorder symptoms. An elevated intolerance of uncertainty specifically in the domain of eating and weight demonstrated a strong relationship with dietary restraint and other eating disorder symptoms, however a significant relationship was not observed between general intolerance of uncertainty and dietary restraint. Intolerance of uncertainty specific to eating and weight was also found to make a unique and significant contribution to the prediction of dietary restraint, beyond the contribution of shape and weight concerns, negative emotional symptoms, perfectionism, and self-esteem, suggesting that intolerance of uncertainty specifically in the domain of eating and weight can explain a component of dietary restraint that is not captured by other central eating- and anxiety-related constructs. The demonstration of an association between intolerance of uncertainty specific to eating and weight and a key eating disorder behaviour (i.e., dietary restraint) adds strength to the proposed link between intolerance of uncertainty and eating disorder symptoms, but the lack of association between general intolerance of uncertainty and dietary restraint suggests that continued exploration into the specificity of the intolerance of uncertainty construct in the eating disorder context is warranted.

In addition to the establishment of covariation, the second study also tested a mediational model and found intolerance of uncertainty specific to eating and weight to partially mediate the relationship between shape and weight concerns and dietary

restraint. This model suggests that high shape and weight concerns may prompt a heightened intolerance of uncertainty specific to eating and weight, since uncertainty in this context is likely to be particularly aversive for individuals with a high investment in shape and/or weight. In turn, an elevated intolerance of uncertainty in the domain of eating and weight may subsequently trigger increased dietary restraint in an effort to reduce uncertainty and/or corresponding negative affect. The findings provided preliminary support for this model specifying intolerance of uncertainty specific to eating and weight as a mechanism of influence in the relationship between shape and weight concerns and dietary restraint, with a proposed bi-directional relationship denoting intolerance of uncertainty as a possible maintenance factor for eating disorder symptoms. The research was cross-sectional, however, and the need for experimental research to infer causality in these relationships was acknowledged.

In response to the need for investigation into causal pathways, the third and final study examined causal relationships between intolerance of uncertainty and eating- and weight-related variables through an experimental manipulation of intolerance of uncertainty using a university-based sample of adult women. This study comprised the first research to experimentally manipulate intolerance of uncertainty to examine its effects in the context of eating disorder symptoms. The findings indicated that a higher intolerance of uncertainty induced heightened negative affect in the context of eating-related uncertainty relative to lower intolerance of uncertainty. Although this finding requires replication, it is consistent with previous research indicating a high intolerance of uncertainty to be associated with, and elicit, negative affect (Buhr & Dugas, 2006; Greco & Roger, 2003; Sexton & Dugas, 2009).

Contrary to expectations, intolerance of uncertainty did not predict eating- and weight-related variables in the study, suggesting that a general intolerance of uncertainty may contribute to eating disorder symptoms only indirectly, that is, via an

increase in negative affect (given the well-established association between negative affect and a wide array of eating disordered attitudes and behaviours; Cassin & von Ranson, 2005; Cooley & Toray, 2001; Kaye et al., 2004; Stice, 2001; Stice & Agras, 1998; Stice et al., 1998). The absence of a significant effect for intolerance of uncertainty, particularly in combination with high shape/weight overvaluation, in predicting eating- and weight-related outcomes was somewhat surprising, given the findings of the first study and the associations observed in previous research (e.g., Konstantellou & Reynolds, 2010), however the finding was consistent with the second study of the current research, which observed a non-significant relationship between general intolerance of uncertainty and dietary restraint. These findings suggest that a general intolerance may not be sufficiently powerful to affect eating- and weight-related responses. Despite this result, a number of insights and directions for future research can be garnered from this initial investigation (see Chapter 4), and it is possible that a larger, clinical sample employing a slightly modified methodology may produce different results.

In sum, the qualitative descriptions of eating disorder patients in the first study and the strength of the associations between eating- and weight-specific intolerance of uncertainty and eating disorder symptoms in the second study support a significant relationship between intolerance of uncertainty and eating disorder symptoms. While the third study did not observe a direct relationship between a general intolerance of uncertainty and several eating- and weight-related variables, a number of possible reasons for this have been discussed (see Chapter 4), and it is considered premature to discount a significant causal association between the constructs based on this study alone. Rather, the findings indicate (a) a potentially more important role of an intolerance of uncertainty specific to eating, shape, and weight than a general intolerance of uncertainty, (b) a potentially distal role of general intolerance of

uncertainty via its contribution to heightened negative affect, which may subsequently increase eating disorder symptoms, and (c) useful directions for future research seeking to experimentally manipulate intolerance of uncertainty in the eating disorders context.

5.2 Theoretical and Clinical Implications

The findings of the current research have a number of important theoretical and clinical implications. Firstly, the series of studies has contributed to the construction of a theoretical model of the role of intolerance of uncertainty in the maintenance of eating disorder symptoms. Both general and context-specific intolerance of uncertainty were investigated in the research, with intolerance of uncertainty specific to eating and weight appearing to occupy a stronger role in the context of eating disorder symptoms than general intolerance of uncertainty. Further to this, intolerance of uncertainty specific to eating and weight was postulated to mediate the relationship between shape and weight concerns and dietary restraint. While this model was supported by the correlational study, causality could not be inferred. The experimental study did not find intolerance of uncertainty to influence eating- and weight-related variables, however intolerance of uncertainty in general was manipulated, and thus conclusions cannot be made regarding the context-specific measure. The proposed model specifying the context-specific intolerance of uncertainty construct as a mediator of shape and weight concerns and dietary restraint, and general intolerance of uncertainty as a trigger for negative affect which in turn triggers eating disordered symptoms, is worthy of future research attention, and an experimental manipulation of intolerance of uncertainty specific to eating, shape, and weight is recommended in order to clearly examine this proposal.

The current research also highlights the importance of investigating intolerance of uncertainty specifically in the context of eating disorder symptoms. Intolerance of uncertainty is not unique to eating disorders, and indeed has previously been

hypothesised to be a mechanism underlying all anxiety disorders (Carleton, Sharpe, & Asmundson, 2007). However, while the construct may present across conditions, research investigating intolerance of uncertainty in the specific context of eating disorders is required to (a) confirm an explicit association, and (b) determine specific characteristics or outcomes of an intolerance of uncertainty that may be unique to the eating disorder domain. Based on the current findings, the emotional and cognitive reactions associated with an intolerance of uncertainty appear similar across eating and anxiety disorders (e.g., increased anxiety and catastrophising), however the particular coping mechanisms employed to reduce uncertainty and the associated affect may be more context-specific (e.g., the use of dietary restraint in the eating disorder context to reduce the uncertainty associated with food consumption). Drawing upon research conducted in other settings is useful for conceptualising intolerance of uncertainty, however the current research can provide additional insight into the nuances of an intolerance of uncertainty as it presents in the context of eating, shape, and weight.

The current research findings also inform the clinical assessment and formulation of eating disorder symptoms. Findings from the first study suggest an intolerance of uncertainty to prompt engagement in eating disorder behaviours, which are used as a mechanism for coping with uncertainty and its attendant distress. Specifically, patients described not knowing how to effectively cope with uncertainty, and instead employed a range of maladaptive coping strategies, including eating disorder behaviour (e.g., purging), avoidance (e.g., rejecting new or different foods), excessive information seeking (e.g., weight checking), and overcompensation (e.g., excessive dietary restriction). Such maladaptive coping strategies were also observed in the second study in terms of intolerance of uncertainty specific to eating and weight predicting dietary restraint. In addition, this pattern is consistent with previous research identifying problem solving difficulties as a potential outcome of a high intolerance of

uncertainty, noting that individuals may continually seek information to increase their certainty or solve a problem ineffectively in an attempt to decrease uncertainty quickly (Ladouceur et al., 1997; Leite & Kuiper, 2008). The current research findings therefore support the utility of including intolerance of uncertainty as a factor for consideration in eating disorder assessments and formulations since, for certain individuals, intolerance of uncertainty may constitute a contributing factor for eating disorder behaviours and associated features, as well as resistance to engaging in treatment recommendations (such as minimising dietary restraint) which intensify uncertainty.

In addition to eating disorder assessment and formulations, intolerance of uncertainty may also be considered with regard to existing maintenance models of eating disorder symptoms. As acknowledged by numerous researchers, the identification of maintenance factors is particularly important for informing eating disorder treatments (Shafran & de Silva, 2003; Stice, 2002). Intolerance of uncertainty as a maintenance factor is postulated to be exacerbated by overconcern about shape and weight, and to subsequently contribute to engagement in specific eating disorder behaviours (e.g., dietary restraint, purging, binge eating), utilised in an attempt to reduce uncertainty and/or alleviate the associated negative affect. Intolerance of uncertainty is therefore expected to fit with current conceptualisations of eating disorder maintenance. A particularly valuable model for positioning intolerance of uncertainty is the transdiagnostic cognitive-behavioural model developed by Fairburn and colleagues (2003). This model describes both core maintaining mechanisms (e.g., dietary restraint, other weight-control behaviour) and non-specific maintaining processes (e.g., clinical perfectionism, interpersonal difficulties), which interact and serve to reinforce the core psychopathology of over-evaluation of eating, shape, and weight and their control (see section 1.10 for a detailed discussion). Intolerance of uncertainty may be positioned in this model as another contributing factor, which is likely to interact with the core

maintenance factors, such as dietary restraint and other weight-control behaviour, through the mechanisms outlined above. In regard to the specificity of the factor, intolerance of uncertainty specific to eating and weight may present as a core maintaining mechanism exhibited by the majority of individuals with an eating disorder. Conversely, a general intolerance of uncertainty may present as a non-specific factor that may only operate for a subset of individuals. While further research is needed, the utility of including intolerance of uncertainty (general and/or specific to eating, shape, and weight) in eating disorder maintenance models warrants future research attention.

Intolerance of uncertainty may, correspondingly, be considered in the associated treatment, enhanced cognitive behaviour therapy for eating disorders (CBT-E), which comprises two treatment versions (see Fairburn, 2008). The first, focused version concentrates exclusively on the core eating disorder psychopathology. The second, broad version also addresses non-specific factors or mechanisms that are outside the core eating disorder psychopathology, which may still contribute to the maintenance of an eating disorder for a subset of patients. This broader version therefore includes additional treatment modules addressing clinical perfectionism, core low self-esteem, and interpersonal difficulties. Both versions have been shown to produce substantial change in a sample of patients with a diagnosed eating disorder, with gains maintained at a 60-week follow-up (Fairburn et al., 2009). A subset of patients who displayed an additional maintaining mechanism responded better to the broad version and, as such, this version is suggested for use with patients who exhibit additional psychopathology corresponding to the areas targeted by the extended treatment (Fairburn et al., 2009). General intolerance of uncertainty, conceptualised as a non-specific maintaining factor, could similarly be addressed through a supplementary treatment component for use with a subset of individuals. Conversely, intolerance of uncertainty specific to eating, shape, and weight, conceptualised as a specific factor, may be addressed in the focused version

of treatment for all individuals presenting with an eating disorder. The development of such treatment extensions may be informed by a previously established cognitive-behavioural treatment protocol for intolerance of uncertainty, originally designed to target worry in generalised anxiety disorder (see Dugas & Ladouceur, 2000; Dugas & Robichaud, 2007; Ladouceur, Dugas, et al., 2000). This treatment could reasonably be modified for use within the eating disorder context to target either general or disorder-specific intolerance of uncertainty. The augmentation of CBT-E (and indeed treatment approaches for eating disorders generally) is clearly warranted given that a substantial proportion of patients continue to experience eating disorder symptoms in the clinical range at post-treatment. For instance, following a 20-week CBT-E treatment, 48.7% (n = 75) retained a level of eating disorder symptoms more than one standard deviation above the community mean (Fairburn et al., 2009).

Finally, the current research also highlights intolerance of uncertainty as a factor for consideration in motivation for treatment among individuals with an eating disorder. Insight into treatment motivation is highly valuable, since low motivation and treatment disengagement are common difficulties in the eating disorders field (Blake et al., 1997; Casasnovas et al., 2007; Martinez et al., 2007; Rieger et al., 2002; Vitousek et al., 1998). Patient reports from the first study suggest that the treatment process and inpatient treatment in particular invoke a host of distressing uncertainties for patients (e.g., uncertainty regarding the composition of food to be consumed). In addition, future treatment outcomes were described by patients as highly uncertain and threatening. Such uncertain outcomes may relate to the bodily changes associated with regaining weight, relationship changes as one recovers from an eating disorder, and life beyond the sick role. This issue has been alluded to previously by researchers, such as Fairburn (2008), who acknowledged that a need for routine and predictability may equate to "not risking change" with treatment (p. 165). While uncertainties may pose a

threat to treatment engagement, it is impossible and undesirable to completely eliminate these uncertainties. Rather, it may be important to screen for an intolerance of uncertainty, since such an intolerance may serve as a barrier to treatment or even lead to treatment drop-out if uncertainty regarding treatment or recovery becomes overwhelming for the patient. For individuals found to experience a high intolerance of uncertainty, a treatment component targeting beliefs about uncertainty and generating strategies for coping with uncertainty may reduce their anxiety during eating disorder treatment, hence increasing treatment engagement and decreasing treatment drop-out.

5.3 Methodological Limitations

In addition to the limitations relevant to each study and identified in their respective chapters, two noteworthy methodological limitations relevant to the current research project as a whole pertain to (a) sampling and corresponding generalisability, and (b) the measurement of intolerance of uncertainty. The samples employed in the current research restrict the generalisability of the findings in a number of respects. Firstly, only women were included in the samples employed, therefore the results cannot be generalised to men. The decision to restrict the sample to women only was made on the basis that women represent the majority of the eating disorder population and are therefore the primary gender of significance for informing treatment. In addition, the inclusion of men in community-based samples is likely to skew the data set and dilute the overall strength of the findings, since men typically cluster towards the lower end of the spectrum of eating disorder symptoms (APA, 2000; Fairburn et al., 2008; Strong, Williamson, Netemeyer, & Geer, 2000). While previous research has not found evidence for gender differences in intolerance of uncertainty, eating disorder features can vary by gender. Future research should investigate whether the current findings are replicated in men, especially in terms of the eating disorder symptoms that

men are more vulnerable to experiencing (i.e., muscle dysmorphia symptoms) (Murray et al., 2012).

Secondly, two of the three studies employed non-clinical samples, thus replication with clinical populations is required to generalise findings to individuals with a diagnosed eating disorder. The use of non-clinical samples was considered sufficient on the basis of (a) previous research demonstrating non-clinical samples to exhibit a range of eating disorder symptoms (Hay et al., 2008; Striegel-Moore et al., 2009), (b) the exploratory nature of the current research, and (c) ethical considerations pertaining to the induction of intolerance of uncertainty in vulnerable individuals. The qualitative study employed a clinical sample with a small number of participants (as recommended for the use of Interpretive Phenomenological Analysis), however this decision was made with the intention of sacrificing breadth to attain depth - a specific goal of the study. The findings gained in the qualitative research provided specific avenues to guide and support investigation in the larger samples of the second and third studies. Finally, due to the exclusion of a subset of participants in the third study, replication of the findings with a larger sample is recommended, as the sample size may have influenced the power of the study. However, this concern is somewhat mitigated by the fact that no findings were found to be marginally significant. That is, significant and non-significant findings were clearly delineated.

In addition to sampling considerations, the measurement of intolerance of uncertainty (especially general intolerance of uncertainty) may be a limitation in the current research. The general measure of intolerance of uncertainty, the IUS (Buhr & Dugas, 2002), was employed in the second study of the current research and utilised as a component of the manipulation in the third study. The shortened version, the IUS-12 (Carleton, Norton, & Asmundson, 2007), was also used in the third study as a measure of baseline intolerance of uncertainty. Although the IUS has shown good psychometric

properties in some research (e.g., Buhr & Dugas, 2002; Freeston et al., 1994), several large studies have raised concerns regarding the instability of the factor structure and a lack of relatedness between items (e.g., Carleton, Norton, & Asmundson, 2007; Norton, 2005). The IUS has also been argued to assess general reactions to uncertainty, rather than an explicit *intolerance* of uncertainty (Gosselin et al., 2008). An alternative measure, the Intolerance of Uncertainty Inventory (IUI; Gosselin et al., 2008), was developed to address this limitation (see section 1.6). Therefore, although the IUS appeared to successfully manipulate intolerance of uncertainty in a previous study (Rosen et al., 2007) and in the third study of the current research, the use of an alternative measure, such as the IUI, is recommended for future research as a potentially useful alternative tool that may enable a more comprehensive manipulation and precise measurement of intolerance of uncertainty.

Finally, the context-specific measure of intolerance of uncertainty used in the current research is also worthy of discussion. Intolerance of uncertainty specific to eating and weight was assessed through the intolerance of uncertainty subscale of a recently developed measure of obsessive-compulsive beliefs in the eating disorder context, the OBQ-EDV (Schembri, 2010). Due to its recent development, the psychometric properties of the OBQ-EDV, while appearing promising, require further assessment. In addition, the use of the intolerance of uncertainty subscale alone has not been previously examined. While the intolerance of uncertainty and perfectionism subscales were defined as distinct in the OBQ-EDV, the original measure from which the OBQ-EDV was based (the OBQ-44; OCCWG, 2005) comprised a combined perfectionism/intolerance of uncertainty subscale. The conceptualisation of the intolerance of uncertainty construct in previous research and the preliminary analysis in the second study of the current research support intolerance of uncertainty and perfectionism as two distinct constructs, however future research is necessary to

validate the subscales of the OBQ-EDV. The incorporation of the OBQ-EDV in large-scale research would be ideal to further establish the reliability and validity of this promising measure. Finally, although the OBQ-EDV comprised items pertaining to eating and weight, it did not specifically assess uncertainty regarding shape. In terms of its use as a measure of intolerance of uncertainty specifically in the eating disorder context, a broader assessment encompassing the three areas of eating, shape, and weight would be ideal.

5.4 Recommendations for Future Research

Only a small number of studies have previously investigated intolerance of uncertainty in the eating disorders context, and the current research has incorporated several unique investigations in this domain. As such, this research is regarded as preliminary and an emphasis is placed on replication. In addition, modifications and extensions (as outlined in Chapters 2-4) are recommended to enhance future research in this field. In particular, since the experimental study was the first of its kind, replication is required to validate the findings and modifications of the experimental paradigm are suggested to clarify the relationships more specifically. While the current research has provided initial insight into a role of intolerance of uncertainty in the maintenance of eating disorder symptoms, further research is needed to examine the mechanisms of influence and conditions through which this relationship takes effect. A number of specific considerations for future research are further detailed below.

Investigation into intolerance of uncertainty in the eating disorders context is still in its infancy, and this warrants careful deliberation regarding clinical sampling. Clinical samples are notoriously difficult to obtain, and such populations (e.g., inpatients) can suffer from being over-researched. Eating disorder populations, particularly in inpatient settings, are highly vulnerable, and careful consideration should be made before employing the efforts of these individuals unnecessarily. With this in

mind, it is recommended that exploratory research continues to utilise community-based samples, since the spectrum of eating disorder symptoms may still be observed in this population. After obtaining a better understanding of the relevant constructs, research employing clinical samples is then recommended to test specific hypotheses and investigate a subset of issues predicted to be of primary relevance. One valuable avenue for research specifically with clinical populations, which could build on findings of the first study of the current research, pertains to the investigation of differences in the experience of uncertainty across the specific types of eating disorders.

Intolerance of uncertainty may be conceptualised as either a specific or non-specific maintenance factor, either of which could feasibly be addressed through an extension of existing eating disorder treatments, such as enhanced cognitive behaviour therapy for eating disorders (CBT-E; Fairburn, 2008). Cognitive-behavioural therapy is widely considered as a first-line treatment for adults with a range of eating disorders (most notably bulimia nervosa), and has a solid evidence base supporting its efficacy (see Chambless & Ollendick, 2001; Keel & Haedt, 2008; Murphy, Straebler, & Fairburn, 2010; NICE, 2004). However, while an intolerance of uncertainty treatment component is likely to fit within a cognitive-behavioural framework for eating disorders, further research is required before implementing such a proposal. In addition, future research may assist in the development of a suitable adaptation of an existing intolerance of uncertainty treatment for the eating disorders context.

Further investigation into the unique characteristics of intolerance of uncertainty in the eating disorder context is also expected to be beneficial. The emotional and cognitive responses to uncertainty reported by eating disorder patients in the current research appeared similar to expressions of intolerance of uncertainty in other populations, however the specific coping mechanisms differed to the mechanisms observed in other clinical disorders. Future research is likely to assist in clarification of

the specific features of an intolerance of uncertainty that may present exclusively in the eating disorder context. Particular appraisals or interpretations of uncertainty may also be unique to the eating disorder context, and increased insight into such features may assist in adapting a general intolerance of uncertainty treatment to the eating disorders context. Research comparing the experience of an intolerance of uncertainty in eating disorders, other clinical disorders, and non-clinical controls would be highly beneficial in this regard.

Finally, a more detailed consideration of anxiety in understanding the relationship between intolerance of uncertainty and eating disorder symptoms may be beneficial. The current research did not control for anxiety, and this was not considered necessary since anxiety is a naturally-occurring, common feature of eating disorders. As such, controlling for anxiety or including only participants without comorbid anxiety would not be representative of most individuals who report eating disorder symptoms, and would therefore restrict the generalisability of the findings. As outlined earlier, previous research has found individuals with eating disorders both with and without comorbid generalised anxiety disorder to show elevated intolerance of uncertainty (Konstantellou et al., 2011). However, given the strong relationship between eating disorders and anxiety disorders, and the significant role of intolerance of uncertainty in anxiety disorders, future research may benefit from a more explicit assessment of anxiety disorder symptoms in the eating disorder context, in order to explicate the differing relationships these features may exhibit with regard to an intolerance of uncertainty. Several characteristic symptoms of OCD in particular (e.g., checking behaviours) appear relevant to intolerance of uncertainty as observed in the eating disorders context, and the shared features of intolerance of uncertainty as it presents in both OCD and eating disorders is considered particularly worthy of future research.

5.5 Conclusions

The current research project employed qualitative, correlational, and experimental methodologies to examine the role of intolerance of uncertainty as a maintenance factor for eating disorder symptoms. The studies have demonstrated novel empirical evidence pertaining to the relationship between intolerance of uncertainty and eating disorder symptoms. Initial qualitative exploration found uncertainty to be experienced by eating disorder patients as negative, intense, and pervasive across contexts, with patients citing frequent use of maladaptive coping mechanisms in response to their aversive experience of uncertainty. Correlational investigation further demonstrated a link between intolerance of uncertainty and a range of eating disorder symptoms, with intolerance of uncertainty specific to eating and weight proposed as a mediator of the relationship between shape and weight concerns and dietary restraint. Finally, an experimental paradigm, created on the basis of previous research, was employed to manipulate intolerance of uncertainty and examine the effects in the context of eating disorder symptoms. This research was the first of its kind, suggesting that intolerance of uncertainty may affect eating disorder symptoms via its impact on negative mood, although a number of potential modifications and extension of the paradigm were recommended for future research in order to draw more definitive conclusions regarding the causal role of intolerance of uncertainty.

Overall, the findings provide preliminary support for a role of intolerance of uncertainty in eating disorder maintenance, and suggest a number of important implications for theory and treatment. The evidence presented in the current research provides initial support for considering intolerance of uncertainty in eating disorder formulation, maintenance, and treatment models, and seeks to encourage further examination of intolerance of uncertainty in the eating disorder context. A treatment component addressing a high intolerance of uncertainty – whether general and/or

specific to the eating disorder context – has the potential to yield much-needed improved treatment outcomes to benefit the individuals, families, and treating practitioners dealing with these debilitating conditions.

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Appendix A

Study One: Participant Characteristics

Participant 1	
Age	26 years
Height	165.0cm
Weight	67.9kg
BMI	24.9
Diagnosis	EDNOS (BN)
Age of first diagnosis	20 years (6 years since diagnosis; 11 years total history)
Change over time	Yes. Began age 14-15 (bulimic) but undiagnosed for 4-5 yrs. BN diagnosed at age 20; EDNOS after weight loss; then AN, then back to BN, now "everything"
Other diagnoses	Depression ("on and off" antidepressants since age 18) Bipolar (diagnosed at age 21).
Current treatment	Inpatient - First received treatment at 20 years - Have received treatment steadily since this time - Recent treatment: at a day program for 4 months, then 5-week gap, then current admission - Current admission for five weeks to date
Current medication	Lovan (antidepressant), Seroquel, Roaccutane, Valium, Temazepam
Country of birth	Australia
Lives with	Parents/family
Education completed	Year 10, Year 12
Study status	Part-time
Employment status	Unemployed

Participant 2	
Age	26 years
Height	163.5cm
Weight	50.0kg (current) (47.7kg at admission)
BMI	18.7
Diagnosis	EDNOS ("in between being anorexic and bulimic") DSM-V – AN-B/P
Age of first diagnosis	16 years (10 year history)
Change over time	Yes. ED at 15, diagnosed at age 16 with AN (1.5-2 years), then BN (2 years), then period of recovery at age 20, then relapse 2 years ago, diagnosed with EDNOS
Other diagnoses	Depression and anxiety
Current treatment	Inpatient - First received treatment at 16 years. - Have received treatment on and off since this time. - Treatment has included: outpatient, inpatient, 4-6 admissions (lived in rural town – no specialised treatment and not a lot of support between admissions). - In current relapse, have received treatment for just over 2 years, including inpatient at two hospitals, outpatient, psychology and psychiatry, day program, and dietician.
Current medication	Lovan (antidepressant), Valium (PRN), recently off Seroquel
Country of birth	Australia
Lives with	Parents/family
Education completed	Year 10, Bachelor degree
Study status	Part-time
Employment status	Not in the labour force

Participant 3	
Age	18 years
Height	151.5cm
Weight	44.4kg (current) (42.1kg at admission)
BMI	19.3
Diagnosis	AN-R (purging and exercise)
Age of first diagnosis	15 years (3 year history)
Change over time	No
Other diagnoses	Depression (since age 8; undiagnosed until high school)
Current treatment	Inpatient - First received treatment at age 16. - Have received treatment on and off since this time. - Treatment has included: approximately ten hospital admissions; seeing psychologists and dieticians. - Current admission for four weeks to date.
Current medication	Pristiq (antidepressant), Seroquel, Lamotrigine
Country of birth	Australia
Lives with	Parents/family
Education completed	Year 10
Study status	Not currently studying (left Year 12 partway through year)
Employment status	Not in labour force

Participant 4	
Age	20 years
Height	162.7cm
Weight	48.5kg (current) (45.1kg at admission)
BMI	18.3
Diagnosis	AN-R
Age	20 years
Age of first diagnosis	19 years (1 year history)
Change over time	No
Other diagnoses	Depression
Current treatment	Inpatient - First received treatment at 19 years - Saw a psychologist twice before admitted to hospital. - First admitted to emergency, discharged, then back in hospital two days later – in a public hospital for over a month. Then admitted to inpatient. Has been inpatient for 2 months.
Current medication	Antidepressant, Seroquel
Country of birth	Australia
Lives with	Parents/family
Education completed	Year 10, Year 12
Study status	Full-time, second year of university
Employment status	Part-time/casual

Participant 5	
Age	18 years
Height	164.0cm
Weight	44.6kg
BMI	16.6
Diagnosis	AN-R
Age	18 years
Age of first diagnosis	18 years (5 weeks since diagnosis; less than 6 months total history)
Change over time	No
Other diagnoses	None
Current treatment	Inpatient - Current admission for four weeks to date - No other treatment
Current medication	Zoloft (antidepressant)
Country of birth	Australia
Lives with	Parents/family
Education completed	Year 10, Year 12
Study status	Not currently studying
Employment status	Unemployed

Appendix B

Study One: Initial Information Form

INITIAL INFORMATION

This initial information will help us understand the range of individuals participating in this study.

1. Birth date: _____

2. Country of birth: _____

   a.) If born overseas, years and months living in Australia? _____

3. Living arrangement:
   a.) Alone ☐
   b.) With parents/family ☐
   c.) With friends/housemates ☐
   d.) With partner ☐
   e.) Other (please specify)

   _____

4. Please tick ALL of the following education/training that you have completed:
   a.) Year 10 ☐
   b.) Year 12 ☐
   c.) Trade or other certificate ☐
   d.) Diploma ☐
   e.) Advanced diploma ☐
   f.) Graduate diploma ☐
   g.) Apprenticeship ☐
   h.) Bachelor degree ☐
   i.) Honours degree ☐
   j.) Masters ☐
   k.) Doctoral degree ☐
   l.) Other (please specify)

   _____

5. Current studying status:
   a.) Full-time ☐ Year of school: _____
   b.) Part-time ☐ Year of school: _____
   c.) No ☐

6. Current employment status:
   a.) Employed, full time ☐
   b.) Employed, part time/casual ☐
   c.) Unemployed ☐
   d.) Not in the labour force ☐
   e.) Other (please specify)

   _____

Appendix C

Study One: Semi-Structured Interview

SEMI-STRUCTURED INTERVIEW SCHEDULE

1. INTRODUCTION

Thank you for participating in this research project. The interview will take approximately 30 minutes.

Provide information sheet

Explain confidentiality

Is it ok to audio-tape our discussion?

Sign research consent forms

- Height:
- Weight:
- BMI:

2. INITIAL INFORMATION QUESTIONNAIRE

3. HISTORY OF EATING DISORDER

7. Do you currently have an eating disorder diagnosis? Y / N – If NO, go to Q2
   a.) What type? AN-R / AN-BP / BN / EDNOS
   b.) At what age were you first diagnosed (years and months)?
   c.) Has the diagnosis changed over time?

   … Go to Q3

8. Have you previously been diagnosed with an eating disorder? Y / N
   a.) What type? AN-R / AN-BP / BN / EDNOS
   b.) At what age were you first diagnosed (years and months)?
   c.) How long did you have the diagnosis?
   d.) Did the diagnosis change over time?

   e.) Do you currently consider yourself to be recovered?

- How long have you been well?

9. Do you have any other current or past psychiatric diagnoses? Y / N
   a.) Please describe:

10. Are you currently receiving any treatment for an eating disorder? Y / N
    a.) How long have you been receiving treatment?

11. Have you received treatment in the past for an eating disorder?

    a.) At what age?

    b.) For how long?

Stages of Diagnosis, Treatment and Recovery

Stage:	Pre-ED diagnosis	Period of ED	Post-treatment/ recovery
Age:			
Duration:			

12. Are you currently taking any medication related to your psychological health?

4. UNCERTAINTY

I would like to hear from you about how you experience *uncertainty*. By 'uncertainty' I mean the state of feeling uncertain due to something being unknown, undecided, or not yet determined or established. Just one example of experiencing uncertainty would be waiting to hear about how you performed on an exam. Uncertainty can arise in many areas of our lives and we can respond to it with a variety of thoughts, feelings and behaviours. Your response to uncertainty may have changed across the stages we just discussed, or it might be the same.

Thinking about you in your life right now [with the eating disorder]…

1. Can you think of a recent instance in which you experienced uncertainty?
   a.) What was this instance?

   b.) What thoughts did you have or what did you say to yourself?

   c.) What feelings did you have?

   d.) What physical sensations did you have?

   e.) What did you do to cope with the uncertainty?

2. Can you think of any other instances in which you have felt uncertain about something?
   a.) What was this instance?

   b.) What thoughts did you have or what did you say to yourself?

   c.) What feelings did you have?

d.) What physical sensations did you have?

e.) What did you do to cope with the uncertainty?

[Repeat question 2 until the participant cannot identify any further instances of uncertainty; if not mentioned spontaneously, **probe for instances of eating/weight-related uncertainty and general uncertainty - in your life right now [with the eating disorder]**

3. Can you tell me any more about what uncertainty is like for you - **in your life right now with the eating disorder**?

4. Are there times when you would prefer to be uncertain or ways in which uncertainty can be a good thing - **in your life right now with the eating disorder**?

5. Do you think you respond to uncertainty in the same way as other people - **in your life right now with the eating disorder**?

6. Did you experience any uncertainty during your treatment for your eating disorder?
   a.) Could you describe this?

   b.) How did you cope with this?

Thinking about you in your life before you developed any signs of an eating disorder ...

7. Can you think of an instance in which you experienced uncertainty?
   a.) What was this instance?

   b.) What thoughts did you have or what did you say to yourself?

   c.) What feelings did you have?

   d.) What physical sensations did you have?

   e.) What did you do to cope with the uncertainty?

8. Can you think of any other instances in which you felt uncertain about something – before you developed any signs of an eating disorder?
   a.) What was this instance?

   b.) What thoughts did you have or what did you say to yourself?

   c.) What feelings did you have?

   d.) What physical sensations did you have?

   e.) What did you do to cope with the uncertainty?

[Repeat question 2 until the participant cannot identify any further instances of uncertainty; if not mentioned spontaneously, **probe for instances of eating/weight-related uncertainty and general uncertainty**]

9. Can you tell me any more about what uncertainty was like for you then, before you developed an eating disorder?

10. Were there other times then when you would prefer to be uncertain or ways in which uncertainty could be a good thing, before you developed an eating disorder?

11. Do you think you responded to uncertainty differently before you developed any signs of an eating disorder compared to now?

[ONLY IF CURRENTLY RELAPSED] - Thinking about you in your life when you had recovered from an eating disorder …

12. Can you think of an instance in which you experienced uncertainty?
    a.) What was this instance?

    b.) What thoughts did you have or what did you say to yourself?

    c.) What feelings did you have?

    d.) What physical sensations did you have?

    e.) What did you do to cope with the uncertainty?

13. Can you think of any other instances in which you felt uncertain about something, when you had recovered from the eating disorder?
    a.) What was this instance?

    b.) What thoughts did you have or what did you say to yourself?

    c.) What feelings did you have?

    d.) What physical sensations did you have?

    e.) What did you do to cope with the uncertainty?

[Repeat question 2 until the participant cannot identify any further instances of uncertainty; if not mentioned spontaneously, **probe for instances of eating/weight-related uncertainty and general uncertainty**]

14. Can you tell me any more about what uncertainty was like for you then, when you had recovered?

15. Were there times when you would prefer to be uncertain or ways in which uncertainty could be a good thing, when you had recovered?

16. Do you think you responded to uncertainty differently when you had recovered from your eating disorder compared to now?

Concluding

1. Are there any other comments you would like to make about what we have discussed?

5. SELF-REPORT MEASURES

- GSE
- IUS-12
- FMPS
- IUI
- OBQ-EDV
- EDE-Q

6. DEBRIEF

Do you have any other questions, concerns or comments?

Thank you for your time – your participation in this study is greatly appreciated. [Provide debriefing sheet and information]

Appendix D

Study One: Ethics Approvals, Information Sheet, Consent Form, and Debrief Sheet

APPROVAL FROM ANU HUMAN RESEARCH ETHICS COMMITTEE

Date: Tue, 6 Sep 2011 08:46:37 +1000
From: aries@anu.edu.au
Subject: Human Ethics Protocol 2011/427
To: alice.heikkonen@anu.edu.au
CC: elizabeth.rieger@anu.edu.au; human.ethics.officer@anu.edu.au

Dear Ms Alice Heikkonen,

Protocol: 2011/427
Investigating the experience of uncertainty across stages of illness in eating disorders

I am pleased to advise you that your Human Ethics protocol received approval by the Chair of the HREC on 05/09/2011.

For your information:

1. Under the NHMRC/AVCC National Statement on Ethical Conduct in Human Research we are required to follow up research that we have approved. Once a year (or sooner for short projects) we shall request a brief report on any ethical issues which may have arisen during your research or whether it proceeded according to the plan outlined in the above protocol.

2. Please notify the committee of any changes to your protocol in the course of your research, and when you complete or cease working on the project.

3. Please notify the Committee immediately if any unforeseen events occur that might affect continued ethical acceptability of the research work.

4. Please advise the HREC if you receive any complaints about the research work.

5. The validity of the current approval is five years' maximum from the date shown approved. For longer projects you are required to seek renewed approval from the Committee.

All the best with your research,

Kim

Ms Kim Tiffen
Ethics Manager/rDNA Secretary
Office of Research Integrity,
Research Office,
Ground Floor, Chancelry 10B
Ellery Road

The Australian National University
ACTON ACT 0200
T: +61 6125 3427
F: +61 2 6125 4807
Kim.Tiffen@anu.edu.au or
human.ethics.officer@anu.edu.au

http://www.anu.edu.au/ro/ORI/Human/human_index.php

THE UNIVERSITY OF SYDNEY

RESEARCH INTEGRITY
Human Research Ethics Committee
Web: http://sydney.edu.au/research_support/ethics/human/
Email: ro.humanethics@sydney.edu.au
Address for all correspondence:
Level 6, Jane Foss Russell Building - G02
The University of Sydney
NSW 2006 AUSTRALIA

Ref: IM/KR

29 September 2011

Ms Alice Heikkonen
School of Psychology
Australian National University
Email: alice.heikkonen@anu.edu.au

Dear Ms Heikkonen

Title: Investigating the experience of uncertainty across stages of illness in eating disorders [Protocol No. 14191]

The Executive of the Human Research Ethics Committee (HREC), has reviewed your study to be conducted at The University of Sydney premises and acknowledges your right to proceed under the authority of The Australian National University Human Research Ethics Committee.

The Human Research Ethics Committee advises that you consult with The University of Sydney **Audit and Risk Management Office** (http://sydney.edu.au/audit_risk/) to ensure that University of Sydney staff/students and premises are adequately covered for the purpose of conducting this research project.

Any modifications to the study must be approved by The Australian National University Human Research Ethics Committee. A copy of the approved modification, approved progress report and any new approved documents must be provided to The University of Sydney HREC for our records.

Please do not hesitate to contact Research Integrity (Human Ethics) should you require further information or clarification.

Yours sincerely

Associate Professor Ian Maxwell
Chair
Human Research Ethics Committee

cc: Dr Elizabeth Rieger [Email: Elizabeth.Rieger@anu.edu.au]

Manager Human Ethics
Dr Margaret Faedo
T: +61 2 8627 8176
E: margaret.faedo@sydney.edu.au

Human Ethics Secretariat:
Ms Karen Greer T: +61 2 8627 8171 E: karen.greer@sydney.edu.au
Ms Patricia Engelmann T: +61 2 8627 8172 E: patricia.engelmann@sydney.edu.au
Ms Kala Retnam T: +61 2 8627 8173 E: kala.retnam@sydney.edu.au

ABN 15 211 513 464
CRICOS 00026A

NORTHSIDE CLINIC

Ms Alice Heikkonen

24th March 2012

Dear Ms Heikonnen,

RE: Investigating the experience of uncertainty across stages of illness in eating disorders

The above protocol was considered at the Northside Group Ethics Committee Meeting held on March 23rd 2012 and committee members agreed that this study could proceed, subject to the following:

- That Ms Heikkonen does not approach patients directly for recruitment purposes. Instead, the nursing staff could approach patients about the study if they are agreeable to this, or an introductory letter regarding the study could be prepared, which the nursing staff could distribute. In these scenarios, if a patient shows interest they could then organise to speak with Ms Heikkonen.
- Ms Heikkonen will need to be credentialed at the Northside Clinic before the study can proceed.
- As the protocol includes patients who are potentially under 18, the Committee would like there to be a sentence in the consent form indicating that for patients under 18, parental consent is also required. In addition, there should be an additional line on which a parent could sign their name in consent.
- In the debrief form, instead of referring potentially distressed participants to a Northside psychologist (as psychologist hours at Northside are limited), please change to: "treating psychiatrist".

The documents submitted for review and subsequently approved were:

- Study protocol
- Patient information statement
- Participant consent form
- Questionnaires and semi-structured interview
- Debrief sheet

The following conditions also apply to the research protocol.

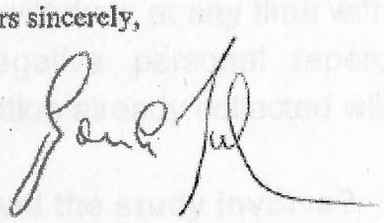
1. The investigator shall permit the work to be monitored by the committee and make available to the committee such records or documents as it may reasonably require.
2. The investigator shall provide an annual report to the committee concerning the progress of the research.
3. The investigator to take all possible steps to preserve confidentiality in regard to any information obtained from a patient and will not divulge any personal identification details to any other person.
4. The Ethics Committee should be informed of any changes to the Research Protocol.

We also wish to draw two other points to your attention:

First, the Committee has considered the protocol only in regard to patients of the Northside Group Hospitals and our advice is not given in relation to similar or associated research work being undertaken with any other patients.

Secondly, if part of the research work has already been done prior to the protocol being referred to the Committee, the Committee cannot give retrospective advice in regard to such work, and this letter does not express any opinion or indicate any approval in relation to such work as may have already been done.

Yours sincerely,



Prof. Gordon Johnson
Chairperson
Northside Group Ethics Committee

Participant Information Sheet

Research Title: Investigating the experience of uncertainty across stages of illness in eating disorders
Investigators: Alice Heikkonen and Dr Elizabeth Rieger

You are invited to take part in this research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and ask if there is anything that is not clear or if you would like more information.

What is the focus of this research?
The current research study involves investigation into the experience of uncertainty for individuals with an eating disorder.

Do I have to take part?
You do not have to take part. Participation in this study is voluntary and you are free to withdraw at any time without giving any reason and without experiencing any negative personal repercussions. If you decide to withdraw, any information already collected will be deleted.

What will the study involve?
The research study involves participation in a brief interview discussing your experience of uncertainty and answering some demographic questions (e.g., age, country of birth). It also involves completing six questionnaires relating to thinking style, uncertainty and eating-related attitudes and behaviour. Data regarding your height and weight will also be collected from your records. The study is likely to take approximately 60 minutes. With your consent, the interview will be audio-recorded to ensure that the information you provide is transcribed accurately. You are able to participate without such audio-recording.

How will the confidentiality of my personal details be ensured?
The interview is audio-recorded and transcribed. However, you will be given a research number which will be recorded (rather than your name) on your assessment information. Your name and contact details will not be attached to your questionnaires or interview data. All electronic information will be password protected. Only those directly involved in the project will have access to this information. All data will be kept for at least **5 years** after which it will be deleted. A report of this study may be submitted for publication but individual participants will not be identifiable in such a report.

Are there any side effects and risks associated with this study?
The risk of psychological harm associated with this study is minimal (no more than that found in everyday life).

What if I have any questions or concerns about the study?
If you have any questions or concerns about the study, please do not hesitate to contact Alice Heikkonen (PhD candidate) from the Department of Psychology at the Australian National University (Alice.Heikkonen@anu.edu.au or (02) 6125 0509). You may also contact Dr Elizabeth Rieger (Research Supervisor) from the Department of Psychology at the Australian National University (Elizabeth.Rieger@anu.edu.au).

If you have any concerns about the way the study is conducted, please contact:
Human Research Ethics Committee Research Office
Chancelry 10B, Lower Ground Floor, East Road, Australian National University, Acton ACT 0200
Phone: (02) 6125 3427
Email: human.ethics.officer@anu.edu.au

If you experience any distress as a result of your participation in the study, you are welcome to discuss this with the researcher Alice Heikkonen or you may like to discuss this with a psychologist at the Northside Clinic.

Participant Consent Form

Research Title: Investigating the experience of uncertainty across stages of illness in eating disorders

Investigators: Alice Heikkonen and Dr Elizabeth Rieger

I state that I am at least sixteen (16) years of age and agree to participate in the research study being conducted by Alice Heikkonen (PhD candidate) and Dr Elizabeth Rieger (Research Supervisor) of the Department of Psychology, Australian National University.

I understand that the focus of this research involves investigating responses to uncertainty by individuals with an eating disorder diagnosis.

I understand that I will be required to complete demographic information, self-report measures, and a semi-structured interview. Data regarding my height and weight will also be collected from my file. I understand that the interview will be audio-taped and transcribed in order to achieve a more accurate and full transcription of the information collected. I also understand that I am able to ask for the tape to be erased.

I have been informed that the researchers do not anticipate more than a minimal psychological risk (no more than that found in everyday life) in completing this study.

I understand that I will not be personally identified in any publication of the results. I also understand that the electronic data will be password protected. I understand that while the results of the research will be made accessible my involvement and my identity will not be revealed.

I understand that my participation is completely voluntary and that I am free to withdraw from the experiment at any time without experiencing any negative personal consequences. I also understand that I can refuse to take part or

withdraw at any time without affecting my medical care. If I do withdraw, any information already collected will be deleted.

Finally, I understand that if I have comments, questions, or concerns following the study, I may contact Alice Heikkonen (Alice.Heikkonen@anu.edu.au) or Dr Elizabeth Rieger (Elizabeth.Rieger@anu.edu.au). I may also bring concerns about the study to the attention of the ANU Human Research Ethics Committee.

After considering the above, I accept the invitation to participate in this study. If under 18 years of age, I understand that parental consent is also required.

Name: (please print) _____ **Date:** _____

Signature: (Participant) _____

(If under 18 years of age)

Name: (Parent) _____

Signature: (Parent) _____

Signature: (Investigator) _____

Signature: (Witness) _____

Participant Debrief Sheet

This study investigates the experience of uncertainty for individuals with an eating disorder. In addition to this, we investigated thinking styles and eating disorder symptoms.

As a participant, you were asked to complete a number of questionnaires addressing your thinking style, eating behaviour and tolerance of uncertainty. You also completed an interview which involved discussing how you experience uncertainty – that is, your thoughts and feelings when faced with an uncertain situation and how you respond to this. Intolerance of uncertainty is a factor that we are investigating in relation to eating disorder symptoms. It has been suggested that people who feel more uncomfortable dealing with uncertainty may also show more symptoms of an eating disorder. In the current study, we are trying to investigate how or why this process might occur. For example, it may be the case that people who find it difficult to cope with the uncertainties of life may experience more anxiety generally and engage in restricted eating or other eating disorder behaviours as a way of reducing their anxiety.

An eating disorder is a serious condition that can pose a considerable threat to health and well-being, and it can cause significant impairment or distress. Attention and commitment is required from sufferers, professionals, and support networks to enable recovery and better treatment.

If you would like further support, please feel welcome to speak to your treating psychiatrist, or visit the Butterfly Foundation website at: www.thebutterflyfoundation.org.au.

Finally, if participation in this study has caused you distress or made you feel uncomfortable in any way, you are welcome to discuss this with the researcher Alice Heikkonen or a psychologist at the Northside Clinic. Alternatively, you may wish to visit your GP to discuss your concerns.

Thank you kindly for your participation in this study.

Appendix E

Study One: Flyer

DO YOU LIKE UNCERTAINTY? ...MAYBE NOT??

RESEARCH STUDY

Most people dislike uncertainty, but having an eating disorder can make managing uncertainty particularly difficult. Viewing uncertainty as threatening can affect many areas of life. It may mean that you need to know the nutritional information in all your food or want to check your weight many times in a day. You may be anxious not knowing what will happen in the future or how you might handle things.

I am interested in understanding and helping people with eating disorders to cope with uncertainty, so I'd really value the opportunity to talk with you about your experience. The research will form part of my PhD.

What does it involve?

1. A brief interview with me discussing your experiences
2. Completing self-report questionnaires
3. Collecting height/weight from your records (you don't need to be weighed specifically for the study)

It will take approx. 60 minutes.
Participation is entirely voluntary!

If you would consider participating, please write your name on the corresponding sheet.

I will go through all the information with you before you participate, so you are still welcome to withdraw at any point!

Researcher: Alice Heikkonen, Australian National University

MANY THANKS FOR ANY HELP YOU'RE ABLE TO PROVIDE!

Appendix F

Obsessive Beliefs Questionnaire – Eating Disorder Version

(OBQ-DEV; Schembri, 2010)

For each of the following statements, please circle the number matching the answer that best describes how you think most of the time.

1 – Disagree very much
2 – Disagree moderately
3 – Disagree a little
4 – Neither agree nor disagree
5 – Agree a little
6 – Agree moderately
7 – Agree very much

1. I often think eating small amounts of food will cause me to gain weight.	1	2	3	4	5	6	7
2. For me, having bad urges to eat is as bad as actually eating.	1	2	3	4	5	6	7
3. I must restrict my diet to avoid putting on weight.	1	2	3	4	5	6	7
4. My weight will shoot up if I am not careful.	1	2	3	4	5	6	7
5. I must keep working at my weight until it is just right.	1	2	3	4	5	6	7
6. The more I think about weight gain, the greater the risk that I will gain weight.	1	2	3	4	5	6	7
7. If I'm not absolutely sure of what I eat, I'm bound to put on weight.	1	2	3	4	5	6	7
8. Avoiding changes in my body shape and weight requires constant effort on my part.	1	2	3	4	5	6	7
9. It is essential for me to consider all possible outcomes of what I eat.	1	2	3	4	5	6	7
10. My body shape should be perfect according to my own standards.	1	2	3	4	5	6	7
11. I should be able to stop myself from having unwanted thoughts about food.	1	2	3	4	5	6	7
12. Even when I am careful, I often think I might gain weight.	1	2	3	4	5	6	7
13. Having a thought about eating large amounts of food is as bad as actually eating the food.	1	2	3	4	5	6	7
14. Failing to prevent gaining weight is just as bad as deliberately gaining weight.	1	2	3	4	5	6	7
15. In order to be a worthwhile person, every aspect of my body must be perfect.	1	2	3	4	5	6	7
16. Not having nutritional information about food I am about to eat upsets me greatly.	1	2	3	4	5	6	7
17. When I see an opportunity to do so, I must act to prevent weight gain.	1	2	3	4	5	6	7

18. Even if gaining weight is very unlikely, I should try to prevent it at any cost.	1	2	3	4	5	6	7
19. To me, failing to prevent putting on weight is as bad as causing weight gain.	1	2	3	4	5	6	7
20. Even eating small amounts of food increases the risk of weight gain.	1	2	3	4	5	6	7
21. If I don't restrict my diet or exercise, then I am to blame for any consequences.	1	2	3	4	5	6	7
22. Having an unwanted thought or image about eating is as bad as actually eating.	1	2	3	4	5	6	7
23. I must be certain of what is contained in the food that I consume (e.g., calories, fat content etc).	1	2	3	4	5	6	7
24. No matter how I look, it won't be good enough.	1	2	3	4	5	6	7
25. If I let myself think about food, I worry I might lose control.	1	2	3	4	5	6	7
26. If I don't look perfect, people won't respect me.	1	2	3	4	5	6	7
27. For me, gaining a little bit of weight is as bad as gaining a lot of weight.	1	2	3	4	5	6	7
28. Not preventing weight gain is as bad as gaining weight.	1	2	3	4	5	6	7
29. Having intrusive thoughts about the look of my body and my weight means I'm out of control.	1	2	3	4	5	6	7
30. I must not eat a certain food if I am unsure of the effect it will have on my weight.	1	2	3	4	5	6	7
31. I am not happy with my body unless it is perfect.	1	2	3	4	5	6	7

Appendix G

Study Two: Ethics Approvals, Information Sheet, Consent Form, and Debrief Sheet

Subject: Human Ethics Protocol 2010/106
To: alice.heikkonen@anu.edu.au
Cc: elizabeth.rieger@anu.edu.au , human.ethics.officer@anu.edu.au

Date: 04/05/10 02:48 PM
From: aries@anu.edu.au

Dear Ms Alice Heikkonen,

Protocol: 2010/106
Investigating intolerance of uncertainty as a maintaining factor for eating disorder symptoms

I am pleased to advise you that your Human Ethics protocol received approval by the Chair of the Science and Medical DERC on 4 May 2010.

For your information:

1. Under the NHMRC/AVCC National Statement on Ethical Conduct in Human Research we are required to follow up research that we have approved. Once a year (or sooner for short projects) we shall request a brief report on any ethical issues which may have arisen during your research or whether it proceeded according to the plan outlined in the above protocol.

2. Please notify the committee of any changes to your protocol in the course of your research, and when you complete or cease working on the project.

3. Please notify the Committee immediately if any unforeseen events occur that might affect continued ethical acceptability of the research work.

4. The validity of the current approval is five years' maximum from the date shown approved. For longer projects you are required to seek renewed approval from the Committee.

All the best with your research,

Kim

Ms Kim Tiffen
Human Ethics Manager/rDNA Secretary
Office of Research Integrity,
Research Office,
Level 3, Innovations Bldg
124 Eggleston Rd
The Australian National University
ACTON ACT 0200
T: +61 6125 3427
F: +61 2 6125 4807
Kim.Tiffen@anu.edu.au or
human.ethics.officer@anu.edu.au

http://anu.edu.au/ro/ORI/Human/human_index.php

THE AUSTRALIAN NATIONAL UNIVERSITY

Participant Information Sheet

Research Title: Investigating Thinking Styles, Mood, and Body Image
Investigators: Alice Heikkonen and Dr Elizabeth Rieger

You are invited to take part in this research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and ask if there is anything that is not clear or if you would like more information.

What is the focus of this research?
The focus of this research involves investigation into the thinking styles people display in relation to mood and body image. The research study involves completing a cognitive task and eight questionnaires relating to mood, thinking style and body image.

Do I have to take part?
You do not have to take part. Participation in this study is voluntary and you are free to withdraw at any time without giving any reason and without experiencing any negative personal repercussions.

What will the study involve?
You will answer a small number of background questions, and complete a short cognitive task and eight brief questionnaires, which should take around 30 minutes.

Will I receive course credit for my participation?
First year psychology students who participate in this research will receive one hour of credit toward the research participation requirement in Psychology 1004 (PSYC1004).

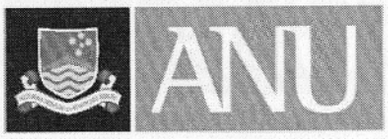
How will the confidentiality of my personal details be ensured?
All data will be completely anonymous. Your name will not appear on any research documentation. All electronic information will be password protected. Only those directly involved in the project will have access to this information. All data will be kept for at least **5 years** after which it will be deleted. A report of this study may be submitted for publication but individual participants will not be identifiable in such a report.

Are there any side effects and risks associated with this study?
The risk of psychological harm associated with this study is minimal (no more than that found in everyday life).

What if I have any questions or concerns about the study?
If you have any questions or concerns about the study, please do not hesitate to contact Alice Heikkonen (PhD candidate) from the Department of Psychology at the Australian National University (Alice.Heikkonen@anu.edu.au).

If you have any concerns about the way the study is conducted please contact:
Human Research Ethics Committee Research Office
Address: Level 3 Innovations Building (124), Australian National University ACT 0200
Phone: (02) 6125 4807
Email: human.ethics.officer@anu.edu.au

If you experience any distress as a result of your participation in the study, please contact:
ANU Counselling Service
Phone: 02 6125 2442 (ext 52442)
Website: http://counselling.anu.edu.au.



Participant Consent Form

Research Title: Investigating Thinking Styles, Mood, and Body Image
Investigators: Alice Heikkonen and Dr Elizabeth Rieger

I state that I am over eighteen (18) years of age and agree to participate in the research study being conducted by Alice Heikkonen (PhD candidate) and Dr Elizabeth Rieger (Research Supervisor) of the Department of Psychology, Australian National University.

I understand that the focus of this research involves investigation into the thinking styles people possess in relation to mood and body image.

I understand that I will be required to complete a small number of background questions, a short cognitive task, and a series of eight brief questionnaires, which should take around 30 minutes.

I have been informed that the researchers do not anticipate more than a minimal psychological risk (no more than that found in everyday life) in completing this study. I understand that all of my responses will be anonymous and that I will not be personally identified in any publication of the results. I also understand that the electronic data will be password protected. Only those directly involved in the research will have access to the data. All data will be kept for at least 5 years after publication of this research.

I understand that my participation in this study is completely voluntary and that I am free to withdraw from the experiment at any time without any experiencing any negative personal consequences. Finally, I understand that if I have any comments, questions, or concerns following the study, I may contact Alice Heikkonen (Alice.Heikkonen@anu.edu.au) or Dr Elizabeth Rieger (Elizabeth.Rieger@anu.edu.au). I may also bring concerns about the study to the attention of the ANU Human Research Ethics Committee.

Proceeding to the next page of the study by clicking on the link below is accepted as agreement to the above terms.

THE AUSTRALIAN NATIONAL UNIVERSITY

Participant Debrief Sheet

This study investigates people's thinking style, mood, and body image. More specifically, we investigated various thought processes (e.g., self-esteem and perfectionism), in addition to symptoms of anxiety, depression, stress and eating disorder symptoms. Our aim is to identify which of these variables are related to symptoms of an eating disorder.

As a participant, you were asked to complete a number of questionnaires addressing aspects of your personality, thinking style, mood, eating behaviour and body image. You also completed a cognitive task which assessed your tolerance for uncertainty – that is, how comfortable or uncomfortable you felt in being faced with an uncertain situation. This is a factor that we are investigating in relation to eating disorder symptoms. We predict that people who feel more uncomfortable dealing with uncertainty may also show more symptoms of an eating disorder. For example, people who find it difficult to cope with the uncertainties of life might experience more anxiety generally and engage in binge eating and other eating disorder behaviours as a way of reducing their anxiety.

An eating disorder is a serious condition that can affect a range of individuals, including our participant group of females aged 18-25. An eating disorder can pose a serious threat to the health and well-being of the person, and can cause significant impairment or distress. Attention and commitment is required from sufferers, professionals, and support networks to enable recovery and better treatment.

If you would like further information on eating disorders (including obtaining help), please visit the Butterfly Foundation website at www.thebutterflyfoundation.org.au.

Finally, if participation in this study has caused you distress or made you feel uncomfortable in any way, please make an appointment with the ANU Counselling Service on (02) 6125 2442 (ext 52442) or at the website, http://counselling.anu.edu.au. Alternatively, you may wish to visit your GP to discuss your concerns.

Thank you kindly for your participation in this study.

Appendix H

Study Two: Flyer

Thoughts, Mood & Body Image

Online Survey

If you are **FEMALE** and **AGED 18-30 years,**

you are invited to take part in an online survey

(approx. 30-40 min)

Receive **$10**

OR **1 hour participation credit**!

Please email Alice (Alice.Heikkonen@anu.edu.au) to find out how to participate. Thank you!

Online Survey ($10 or 1h credit)
Alice.Heikkonen@anu.edu.au
Online Survey ($10 or 1h credit)
Alice.Heikkonen@anu.edu.au
Online Survey ($10 or 1h credit)
Alice.Heikkonen@anu.edu.au
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Alice.Heikkonen@anu.edu.au
Online Survey ($10 or 1h credit)
Alice.Heikkonen@anu.edu.au
Online Survey ($10 or 1h credit)
Alice.Heikkonen@anu.edu.au

Appendix I

Study Three: Measures

Patient Health Questionnaire (PHQ) items

General Mental Health

Please answer every question to the best of your ability. Thank you.

Q. Over the last 4 weeks, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days
Feeling nervous, anxious, on edge, or worrying a lot about different things	○	○	○

Q. Over the last 4 weeks, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days
Feeling restless so that it is hard to sit still	○	○	○
Getting tired very easily	○	○	○
Muscle tension, aches, or soreness	○	○	○
Trouble falling asleep or staying asleep	○	○	○
Trouble concentrating on things, such as reading a book or watching TV	○	○	○
Becoming easily annoyed or irritable	○	○	○

Q. Questions about eating.

	No	Yes
a. Do you often feel that you can't control what or how much you eat?	○	○
b. Do you often eat, within any 2-hour period, what most people would regard as an unusually large amount of food?	○	○

If you checked 'Yes' to BOTH a. and b. ...

	× N/A	No	Yes
Has this been as often, on average, as twice a week for the last 3 months?	○	○	○

Q. In the last 3 months have you <u>often</u> done any of the following in order to avoid gaining weight?

	No	Yes
Made yourself vomit?	○	○
Took more than twice the recommended dose of laxatives?	○	○
Fasted - not eaten anything at all for at least 24 hours?	○	○
Exercised for more than an hour specifically to avoid gaining weight after binge eating?	○	○

If you checked 'Yes' to ANY of these ways of avoiding gaining weight, were any as often, on average, as twice a week?

× N/A	No	Yes
○	○	○

Q. Do you ever drink alcohol (including beer or wine)?

- ○ No
- ○ Yes

Q. Have any of the following happened to you more than once in the last 6 months?

	No	Yes
You drank alcohol even though a doctor suggested that you stop drinking because of a problem with your health	○	○
You drank alcohol, were high from alcohol, or hung over while you were working, going to school, or taking care of children or other responsibilities	○	○
You missed or were late for work, school, or other activities because you were drinking or hung over	○	○
You had a problem getting along with other people while you were drinking	○	○
You drove a car after having several drinks or after drinking too much	○	○

Q. What is your height? (Please give your best estimate and specify your unit of measurement e.g. cm)

Q. What is your weight at present? (Please give your best estimate and specify your unit of measurement e.g. kg)

Combination of Intolerance of Uncertainty Scale – Short Form (IUS-12) items and first 30 items of the NEO Five Factor Inventory (NEO-FFI)

Personality Items (1 of 2)

	Not at all characteristic of me	A little characteristic of me	Somewhat characteristic of me	Very characteristic of me	Entirely characteristic of me
I am not a worrier	○	○	○	○	○
I like to have a lot of people around me	○	○	○	○	○
Unforeseen events upset me greatly	○	○	○	○	○
I don't like to waste my time daydreaming	○	○	○	○	○
I try to be courteous to everyone I meet	○	○	○	○	○
It frustrates me not having all the information I need	○	○	○	○	○
I keep my belongings clean and neat	○	○	○	○	○
I often feel inferior to others	○	○	○	○	○
Uncertainty keeps me from living a full life	○	○	○	○	○
I laugh easily	○	○	○	○	○
Once I find the right way to do something, I stick to it	○	○	○	○	○
One should always look ahead so as to avoid surprises	○	○	○	○	○
I often get into arguments with my family and co-workers	○	○	○	○	○
I'm pretty good about pacing myself so as to get things done on time	○	○	○	○	○
When I'm under a great deal of stress, sometimes I feel like I'm going to pieces	○	○	○	○	○
A small unforeseen event can spoil everything, even with the best of planning	○	○	○	○	○
I don't consider myself especially "lighthearted"	○	○	○	○	○
I am intrigued by the patterns I find in art and nature	○	○	○	○	○
Some people think I'm selfish and egotistical	○	○	○	○	○
When it's time to act, uncertainty paralyses me	○	○	○	○	○
I am not a very methodical person	○	○	○	○	○

Personality Items (2 of 2)

	Not at all characteristic of me				Entirely characteristic of me
I rarely feel lonely or blue	○	○	○	○	○
I really enjoy talking to people	○	○	○	○	○
When I am uncertain I can't function very well	○	○	○	○	○
I believe letting students hear controversial speakers can only confuse and mislead them	○	○	○	○	○
I would rather cooperate with others than compete with them	○	○	○	○	○
I always want to know what the future has in store for me	○	○	○	○	○
I try to perform all the tasks assigned to me conscientiously	○	○	○	○	○
I often feel tense and jittery	○	○	○	○	○
I can't stand being taken by surprise	○	○	○	○	○
I like to be where the action is	○	○	○	○	○
Poetry has little or no effect on me	○	○	○	○	○
The smallest doubt can stop me from acting	○	○	○	○	○
I tend to be cynical and skeptical of others' intentions	○	○	○	○	○
I have a clear set of goals and work toward them in an orderly fashion	○	○	○	○	○
I should be able to organize everything in advance	○	○	○	○	○
Sometimes I feel completely worthless	○	○	○	○	○
I usually prefer to do things alone	○	○	○	○	○
I often try new and foreign foods	○	○	○	○	○
I must get away from all uncertain situations	○	○	○	○	○
I believe that most people will take advantage of you if you let them	○	○	○	○	○
I waste a lot of time before settling down to work	○	○	○	○	○

'Life Domains'

Final Questions

The following questions are concerned with the past 4 weeks (28 days) only. Please read each question carefully.

Over the past 28 days...

	Not at all		Slightly		Moderately		Markedly
Has your personal relationships influenced how you think about (judge) yourself as a person?	○	○	○	○	○	○	○
Has your work or study influenced how you think about (judge) yourself as a person?	○	○	○	○	○	○	○
Has your shape influenced how you think about (judge) yourself as a person ?	○	○	○	○	○	○	○
Has your weight (number on the scale) influenced how you think about (judge) yourself as a person?	○	○	○	○	○	○	○
Has your health influenced how you think about (judge) yourself as a person?	○	○	○	○	○	○	○
Has your family influenced how you think about (judge) yourself as a person?	○	○	○	○	○	○	○
Has your friendships influenced how you think about (judge) yourself as a person?	○	○	○	○	○	○	○

Demographic Questions

1. What is your age? (18 – 30)

2. What is your country of birth? _____

3. If you were born overseas, how long have you been living in Australia? (Years, Months) _____

4. What is your current living arrangement?
   a. Living alone
   b. Living with parents/family
   c. Living with friends/housemates
   d. Living with partner
   e. Other – please specify _____

5. Please tick any of the following types of education/training you have completed:
   a. Year 10
   b. Year 12
   c. Trade or other certificate
   d. Diploma
   e. Advanced diploma
   f. Graduate diploma
   g. Apprenticeship
   h. Bachelor degree
   i. Honours degree
   j. Masters
   k. Doctoral degree
   l. Other - please specify _____

6. Are you currently studying at university?
   a. Yes, full time
   b. Yes, part time
   c. No

7. What is your employment status?
   a. Employed, full time
   b. Employed, part time/casual
   c. Unemployed
   d. Not in the labour force
   e. Other – please specify

   _____

Intolerance of Uncertainty Scale (IUS) – adapted for experimental manipulation

High Intolerance of Uncertainty Condition:

Attitudes toward Uncertainty

You will find below a series of statements which describe how people may react to the uncertainties of life. Please indicate the answer that describes you best.

	TRUE	FALSE
Uncertainty occasionally stops me from having a firm opinion.	○	○
Being uncertain occasionally means that a person is disorganized	○	○
Uncertainty occasionally makes life intolerable	○	○
It's unfair not having any guarantees in life	○	○
Occasionally, my mind can't be relaxed if I don't know what will happen tomorrow	○	○
Uncertainty occasionally makes me uneasy, anxious, or stressed	○	○
Unforeseen events occasionally upset me greatly	○	○
It occasionally frustrates me not having all the information I need	○	○
Uncertainty occasionally keeps me from living a full life	○	○
One should always look ahead so as to avoid surprises	○	○
A small unforeseen event can spoil everything, even with the best of planning	○	○
Occasionally, when it's time to act, uncertainty paralyses me	○	○
Being uncertain means that I am not first rate	○	○
When I am uncertain, I occasionally can't go forward	○	○
When I am uncertain I occasionally can't function very well	○	○
Unlike me, others always seem to know where they are going with their lives	○	○
Uncertainty occasionally makes me vulnerable, unhappy, or sad	○	○
I occasionally want to know what the future has in store for me	○	○
I can't stand being taken by surprise	○	○
The smallest doubt can occasionally stop me from acting	○	○
I should be able to organize everything in advance	○	○
Being uncertain means that I lack confidence	○	○
I occasionally think it's unfair that other people seem to be sure about their future	○	○
Uncertainty occasionally keeps me from sleeping soundly	○	○
I must get away from all uncertain situations	○	○
The ambiguities in life occasionally stress me	○	○
I occasionally can't stand being undecided about my future	○	○

Low Intolerance of Uncertainty Condition:

Attitudes toward Uncertainty

You will find below a series of statements which describe how people may react to the uncertainties of life. Please indicate the answer that describes you best.

	TRUE	FALSE
Uncertainty almost always stops me from having a firm opinion.	○	○
Being uncertain almost always means that a person is disorganized	○	○
Uncertainty almost always makes life intolerable	○	○
It's unfair not having any guarantees in life	○	○
My mind almost always can't be relaxed if I don't know what will happen tomorrow	○	○
Uncertainty almost always makes me uneasy, anxious, or stressed	○	○
Unforeseen events almost always upset me greatly	○	○
It almost always frustrates me not having all the information I need	○	○
Uncertainty almost always keeps me from living a full life	○	○
One should always look ahead so as to avoid surprises	○	○
A small unforeseen event can spoil everything, even with the best of planning	○	○
Almost always, when it's time to act, uncertainty paralyses me	○	○
Being uncertain means that I am not first rate	○	○
When I am uncertain, I almost always can't go forward	○	○
When I am uncertain I almost always can't function very well	○	○
Unlike me, others always seem to know where they are going with their lives	○	○
Uncertainty almost always makes me vulnerable, unhappy, or sad	○	○
I almost always want to know what the future has in store for me	○	○
I can't stand being taken by surprise	○	○
The smallest doubt can almost always stop me from acting	○	○
I should be able to organize everything in advance	○	○
Being uncertain means that I lack confidence	○	○
I almost always think it's unfair that other people seem to be sure about their future	○	○
Uncertainty almost always keeps me from sleeping soundly	○	○
I must get away from all uncertain situations	○	○
The ambiguities in life almost always stress me	○	○
I almost always can't stand being undecided about my future	○	○

Positive and Negative Affect Schedule (PANAS)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word.

Indicate to what extent you feel this way right now, that is, at the present moment.

	Very Slightly or Not at All	A Little	Moderately	Quite a Bit	Extremely
Interested	○	○	○	○	○
Distressed	○	○	○	○	○
Excited	○	○	○	○	○
Upset	○	○	○	○	○
Strong	○	○	○	○	○
Guilty	○	○	○	○	○
Scared	○	○	○	○	○
Hostile	○	○	○	○	○
Enthusiastic	○	○	○	○	○
Proud	○	○	○	○	○

	Very Slightly or Not at All	A Little	Moderately	Quite a Bit	Extremely
Irritable	○	○	○	○	○
Alert	○	○	○	○	○
Ashamed	○	○	○	○	○
Inspired	○	○	○	○	○
Nervous	○	○	○	○	○
Determined	○	○	○	○	○
Attentive	○	○	○	○	○
Jittery	○	○	○	○	○
Active	○	○	○	○	○
Afraid	○	○	○	○	○

Dieting Intentions Scale (DIS)

In the next three months, I intend to go on a diet.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
○	○	○	○	○	○	○

In the next three months, I intend to reduce my calorie intake.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
○	○	○	○	○	○	○

If I diet in the next 3 months, this would be...

Harmful						Beneficial
○	○	○	○	○	○	○
Unpleasant						Pleasant
○	○	○	○	○	○	○
Useless						Useful
○	○	○	○	○	○	○
Foolish						Wise
○	○	○	○	○	○	○
Bad						Good
○	○	○	○	○	○	○

Physical Appearance State and Trait Anxiety Scale (PASTAS)

The statements listed below are used to describe how anxious, tense, or nervous you feel *right now* about your body or specific parts of your body.

***Right now*, I feel anxious, tense, or nervous about:**

	Not at all	Slightly	Moderately so	Very much so	Exceptionally
The extent to which I look overweight	○	○	○	○	○
My thighs	○	○	○	○	○
My buttocks	○	○	○	○	○
My hips	○	○	○	○	○
My stomach (abdomen)	○	○	○	○	○
My legs	○	○	○	○	○
My waist	○	○	○	○	○
My muscle tone	○	○	○	○	○
My ears	○	○	○	○	○
My lips	○	○	○	○	○
My wrists	○	○	○	○	○
My hands	○	○	○	○	○
My forehead	○	○	○	○	○
My neck	○	○	○	○	○
My chin	○	○	○	○	○
My feet	○	○	○	○	○

Appendix J

Study Three: Ethics Approvals, Information Sheet, Consent Form, and Debrief Sheet

Subject: Human Ethics Protocol 2012/018
To: alice.heikkonen@anu.edu.au
Cc: elizabeth.rieger@anu.edu.au , human.ethics.officer@anu.edu.au

Date: 29/02/12 09:55 AM
From: aries@anu.edu.au

THIS IS A SYSTEM-GENERATED E-MAIL. PLEASE DO NOT REPLY. SEE BELOW FOR E-MAIL CONTACT DETAILS.

Dear Ms Alice Heikkonen,

Protocol: 2012/018
Uncertainty and eating disorder symptoms: An experimental manipulation of intolerance of uncertainty

I am pleased to advise you that your Human Ethics protocol received approval by the Chair of the HREC on 28 February 2012.

For your information:

1. Under the NHMRC/AVCC National Statement on Ethical Conduct in Human Research we are required to follow up research that we have approved. Once a year (or sooner for short projects) we shall request a brief report on any ethical issues which may have arisen during your research or whether it proceeded according to the plan outlined in the above protocol.

2. Please notify the committee of any changes to your protocol in the course of your research, and when you complete or cease working on the project.

3. Please notify the Committee immediately if any unforeseen events occur that might affect continued ethical acceptability of the research work.

4. Please advise the HREC if you receive any complaints about the research work.

5. The validity of the current approval is five years' maximum from the date shown approved. For longer projects you are required to seek renewed approval from the Committee.

All the best with your research,

Kim

Ms Kim Tiffen
Ethics Manager
Office of Research Integrity,
Research Services,
Ground Floor, Chancelry 10B
Ellery Road
The Australian National University
ACTON ACT 0200
T: +61 6125 3427
F: +61 2 6125 4807
Kim.Tiffen@anu.edu.au or
human.ethics.officer@anu.edu.au
http://www.anu.edu.au/ro/ORI/Human/human_index.php

Participant Information Sheet

Research Title: Investigating Thinking Styles, Mood, and Body Image
Investigators: Alice Heikkonen and Dr Elizabeth Rieger

You are invited to take part in this research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and ask if there is anything that is not clear or if you would like more information.

What is the focus of this research?
The focus of this research involves investigation into the thinking styles people display in relation to mood and body image.

Do I have to take part?
You do not have to take part. Participation in this study is entirely voluntary and you are free to withdraw at any time without giving any reason and without experiencing any negative personal repercussions. If you decide to withdraw, any information already collected will be deleted.

What will the study involve?
The study involves two parts. The first part can be completed on a computer of your choice and will involve the completion of three questionnaires, which should take around 10 minutes. The second part is conducted on a computer at the ANU. Here you will answer a small number of demographic questions (e.g., your age), write a brief paragraph on a provided topic and complete a number of questionnaires, which should take around 30 minutes.

Will I receive course credit for my participation?
First year psychology students who participate in this research will receive one hour of credit toward the research participation requirement in Psychology 1003 (PSYC1003). Alternatively, first year psychology students who participate in this research can choose to receive $10. All other participants will receive $10.

How will the confidentiality of my personal details be ensured?
All data will be completely anonymous. Your name will not appear on any research documentation. All electronic information will be password protected. Only those directly involved in the project will have access to this information. All data will be kept for at least **5 years** after which it will be deleted. A report of this study may be submitted for publication but individual participants will not be identifiable in such a report.

Are there any side effects and risks associated with this study?
The risk of psychological harm associated with this study is minimal.

What if I have any questions or concerns about the study?
If you have any questions or concerns about the study, please do not hesitate to contact Alice Heikkonen (PhD candidate) from the Department of Psychology at the Australian National University (Alice.Heikkonen@anu.edu.au). You may also contact Dr Elizabeth Rieger (Research Supervisor) from the Department of Psychology at the Australian National University (Elizabeth.Rieger@anu.edu.au).

If you have any concerns about the way the study is conducted, please contact:
Human Research Ethics Committee Research Office
Chancelry 10B, Lower Ground Floor, East Road, Australian National University, Acton ACT 0200
Phone: (02) 6125 3427
Email: human.ethics.officer@anu.edu.au

If you experience any distress as a result of your participation in the study, please contact:
ANU Counselling Service
Phone: 02 6125 2442 (ext 52442)
Website: http://counselling.anu.edu.au.

Participant Consent Form

Research Title: Investigating Thinking Styles, Mood and Body Image
Investigators: Alice Heikkonen and Dr Elizabeth Rieger

I state that I am at least eighteen (18) years of age and agree to participate in the research study being conducted by Alice Heikkonen (PhD candidate) and Dr Elizabeth Rieger (Research Supervisor) of the Department of Psychology, Australian National University.

I understand that the focus of this research involves investigation into the thinking styles people possess in relation to mood and body image.

I understand that the study is to be completed in two sections. The first, consisting of three questionnaires, should take approximately 10 minutes. The second section consists of a small number of background questions, writing a brief paragraph, and completing a series of brief questionnaires, which should take around 30 minutes.

I have been informed that the researchers do not anticipate more than a minimal psychological risk in completing this study.

I understand that all of my responses will be anonymous and that I will not be personally identified in any publication of the results. I also understand that the electronic data will be password protected. Only those directly involved in the research will have access to the data. All data will be kept for at least 5 years after publication of this research.

I have read the corresponding 'Participant Information Sheet'. I understand that my participation is completely voluntary and that I am free to withdraw from the experiment at any time without experiencing any negative personal consequences.

Proceeding to the next page of the study by clicking on the link below is accepted as agreement to the above terms.

Participant Debrief Sheet

About the Study

This study was designed to investigate people's thinking style, mood, and body image. More specifically, we aimed to experimentally manipulate *intolerance of uncertainty* – how comfortable or uncomfortable you feel when faced with uncertainty – to examine the effect this may have on mood, seeking food-related information, intention to diet and body image. The aim of our research is to investigate whether intolerance of uncertainty could serve to maintain eating disorder symptoms.

Research findings suggest that people who feel more uncomfortable dealing with uncertainty may also show more symptoms of an eating disorder. For example, people who find it difficult to cope with the uncertainties of life might experience more anxiety generally and engage in dietary restriction and other eating disorder behaviours as a way of reducing their uncertainty and corresponding anxiety. In the current study, we are investigating whether intolerance of uncertainty may lead to higher negative affect, dieting intentions or searching for food-related information to reduce uncertainty.

As a participant, you completed a task designed to experimentally manipulate your tolerance for uncertainty. This was done via three pathways:

(1) Questionnaire item wording was altered to influence the likelihood of item endorsement. That is, items were either paired with the word "occasionally" (e.g., "Unforeseen events occasionally upset me greatly") or "almost always" (e.g., "Unforeseen events almost always upset me greatly"), based on the assumption that people are more likely to endorse that something is *occasionally* rather than *almost always* true of themselves. High or low endorsement is expected to produce a pattern of thinking consistent with that level of endorsement.

(2) False feedback was then given about your tolerance of uncertainty. ***The feedback you were given was automatically generated and entirely independent of your responses on the questionnaire – it does not indicate your actual degree of tolerance of uncertainty.***

(3) The manipulation was then supplemented by asking you to write a paragraph supporting the position of the feedback provided (i.e., that you were either high or low in your ability to tolerate uncertainty).

We then introduced mild uncertainty (asking you to eat an unknown food) to see what effect being high or low in your ability to tolerate uncertainty had on your mood, body image, intention to diet and tendency to check the nutritional information of the snack you had been asked to consume.

About Intolerance of Uncertainty

Intolerance of uncertainty (IU) refers to a tendency to perceive uncertainty as negative or threatening, and to react to uncertainty with various (typically negative) emotional, cognitive and behavioural responses (Buhr & Dugas, 2006). While a general dislike of uncertainty is considered normative, a high IU is actually *maladaptive*. Given the high degree of uncertainty present in most aspects of everyday life, many situations may be uncomfortable or unbearable for individuals with a high IU. Furthermore, a high IU may result in impaired problem-solving or avoidance of situations which involve uncertainty. IU has been strongly linked to worry and is suggested to be an important risk factor in the development of anxiety disorders (e.g., Holaway, Heimberg, & Coles, 2006). Being able to tolerate or accept uncertainty is *adaptive*, as it helps individuals to engage in everyday activities with ease. You have done well to face uncertainty today by participating in this experiment!

About Eating Disorders

An eating disorder is a serious condition that can affect a range of individuals, including our participant group of females aged 18-25. An eating disorder can pose a serious threat to the health and well-being of the person, and can cause significant impairment or distress. Attention and commitment is required from sufferers, professionals, and support networks to enable recovery and better treatment.

Further Information

If you would like further information on eating disorders (including obtaining help), please visit the Butterfly Foundation website at www.thebutterflyfoundation.org.au. Finally, if participation in this study has caused you distress or made you feel uncomfortable in any way, please make an appointment with the ANU Counselling Service on (02) 6125 2442 or at the website, http://counselling.anu.edu.au. Alternatively, you may wish to visit your GP to discuss your concerns.

Thank you kindly for your participation in this study.

Appendix K

Study Three: Flyer

Thinking, Mood & Body Image Study

If you are a **FEMALE aged 18 - 30 years**, we invite you to participate.

You simply need to book a time with the researcher to complete this computer-based study on two occasions which will take approximately 40 minutes in total to complete.

The study is anonymous and confidential. To find out more, or to participate, please email Alice at **alice.heikkonen@anu.edu.au**.

All participants can receive $10 for taking part in the study. First-year psychology students can choose to receive **1 hour course credit or $10**.

Thank you!

Computer study ($10 or 1h credit)
Email: Alice.Heikkonen@anu.edu.au

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Appendix L

Study Three: Experimental Manipulation Feedback

High intolerance of uncertainty feedback:

> "Based on your responses, it appears that you typically do not tolerate uncertainty. You find uncertainty to be stressful and upsetting and may avoid uncertain events. You may feel that being uncertain is unfair. It may lead to you being unable to take action at times."

Low intolerance of uncertainty feedback:

> "Based on your responses, you appear to tolerate uncertainty well. You find uncertainty to be manageable and do not actively seek to avoid uncertain events. You feel that being uncertain is quite natural. It does not stop you from taking action."